

BOARD OF EDUCATION

REPORT OF THE COMMITTEE
OF INQUIRY INTO PROBLEMS
RELATING TO
PARTIALLY SIGHTED
CHILDREN

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AMERICAN FOUNDATION
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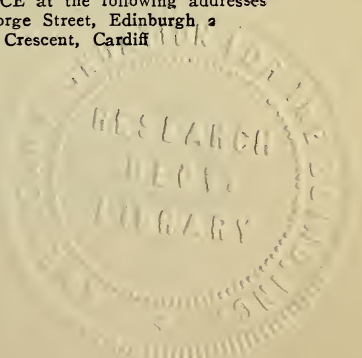
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APPOINTMENT AND TERMS OF REFERENCE

The Committee was appointed in December, 1931, by the Chief Medical Officer of the Board of Education (Sir George Newman, K.C.B.) with the following terms of reference :—

“to inquire into and report upon the medical, educational and social aspects of the problems affecting partially blind children.”

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NOTE

The estimated gross cost of the preparation of the appended Report (including the expenses of the Witnesses and Members of the Committee) is £308 11s. 9d., of which £140 represents the cost of printing and publishing this Report.

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CHAPTER I.

INTRODUCTORY.

A.—Scope of the Inquiry.

The Committee's terms of reference are "to inquire into and report upon the medical, educational and social aspects of the problems affecting partially blind children." It will be convenient to begin by asking what is meant by the term "partially blind," and whether it is the best description of the class of children under review.

The legal enactments under which special provision may be made for the education of children with partial or complete lack of vision, or the welfare of adults, take no cognisance of a state of "partial blindness" as such. In order that a child may be admitted to a Special School his visual condition must fall within the definition of "blindness" given in the Education Act, 1921, while that of an adult must fall within the definition of "blindness" given in the Blind Persons Act, 1920, before he can claim any statutory benefit under that Act.

For the purposes of the Education Act, 1921, the definition of "blindness" is given in Section 69, which states "The expression 'blind' means too blind to be able to read the ordinary school books used by children." On the other hand, the definition of blindness under the Blind Persons Act is based on economic and industrial considerations. For the purpose of grant of an old age pension Section 1 of the Blind Persons Act, 1920 defines a blind person as one who is "so blind as to be unable to perform any work for which eyesight is essential," and in practice this definition is applied for all the purposes of the Act. It has been interpreted in medical terms by the Minister of Health in his Circular 1353.

The Board of Education have given a wide interpretation to the definition contained in the Education Act, and have included as "blind" not only those children whose vision after correction by glasses does not enable them to read ordinary school books, but also those whose vision after correction does not enable them to read such books without risk of detriment to their eyesight. This wide interpretation has brought within the definition of blindness a large and important section of school children, namely, myopes. Even a child with advanced myopia can usually read small print, but in doing so tends to bring the print too close to his eyes, thus causing excessive convergence, which may result in an increase in the myopia and further detriment to his eyesight. This tendency may continue even after suitable correction, designed to enable him to read at greater distances than before. Such a child is certified as "blind" and admitted to a special school, not because his visual acuity is so poor that he is unable to benefit educationally from attendance at the ordinary school, but because the curriculum

of the special school is so designed as to eliminate factors, such as over-use of the eyes for near work, and severe physical strain, which are believed to aggravate the myopic condition.

The definition of blindness under the Education Act is therefore in practice much wider than that under the Blind Persons Act. A child who by reason of visual defect cannot or ought not to follow the curriculum of the ordinary elementary school will not necessarily be incapacitated from following employment for which sight is essential. In fact, it may be said that the majority of children who are "blind" within the definition of the Education Act as administered by the Board of Education, and who are therefore eligible for the benefit of special educational facilities, would be debarred from benefit under the Blind Persons Act.

Children certified as "blind" under the Education Act may be grouped in three categories:—

(a) those who, having no perception of light or having extremely defective vision, cannot be taught by methods involving the use of sight;

(b) those who on account of defective vision cannot follow the ordinary school curriculum, but can see well enough to be taught by special methods involving the use of sight; and

(c) those who are suffering from conditions such as myopia, which may be aggravated by following the ordinary school curriculum.

Children in category (a) are "blind" in the ordinarily accepted sense of that term and do not fall within the scope of the Committee's inquiry. They must be taught by the special methods used in the education of the blind, and the vast majority will be entitled to the benefits of the Blind Persons Act from the age of 16. Cases in categories (b) and (c) are the "partially blind," the group of children with whom the Committee are primarily concerned. The majority of them will never become certifiable under the Blind Persons Act, though a minority suffer from slowly progressive conditions which may eventually lead to severe impairment or even loss of vision.

Partially blind children are therefore part of the sighted community, and except in a few instances they will follow the manifold activities of life as sighted persons. This fact is fundamental.

The term "partially blind" is a misnomer, especially when used to describe myopes, and it is open to the objection that, by its close association with the term "blind," it creates a prejudice against, and imposes a handicap upon, the children to whom it is applied. Attempts to avoid it are sometimes made by designating the special schools for the children whom we are considering as "Schools for Myopes"—again a misnomer as only a proportion of the children in attendance are myopes; or "Sight Saving Schools"—a title which, as will be seen later, begs a very important

question. Again, there is reluctance on the part of many Authorities to certify as "blind" myopic children whose vision after suitable correction is satisfactory, and although it is the usual practice to "certify" children before admission to a special school, in view of this reluctance such children are sometimes admitted without certification. The term "partially blind" has led therefore to confusion both in thought and in practice.

In order to secure as far as possible uniformity of practice in "certification," the Board of Education have in Circular 1431 issued a form of certificate which they recommend for adoption throughout the country. The form of certificate relating to persons under 16 is as follows :—

(a) Is he so blind that he can only be properly taught in a Special School for blind children?

If the answer to this question is "No,"

(b) Has he such bad vision that he cannot read ordinary school books without risk of injury to his sight or that he cannot with advantage be taught in an ordinary elementary school and should, therefore, be taught in a Special School for partially sighted children?

(c) Do you consider it likely that the child will be blind within the meaning of the Blind Persons Act, 1920 on attaining the age of 16?

It is interesting to note that in Scotland this confusion has been avoided, since in that country partially blind children are certified as "physically defective" and not as "blind." This custom appears to have arisen from the fact that although the Education of Blind and Deaf Mute Children (Scotland) Act, 1890, under which educational provision for blind children is made, does not contain a definition of blindness, that Act is now taken to relate in the main to children who are, or will be, blind within the meaning of the Blind Persons Act. As it is an essential preliminary to the provision of special educational facilities for partially blind children that they should be certified by the School Medical Officer as "defective" under one of the two possible categories "blind" or "physically defective," the latter is usually preferred in the case of children who will probably not be entitled to the benefits of the Blind Persons Act from the age of sixteen.

Among the advantages of this arrangement are these; that partially blind children are disassociated from the "blind," and that a closer and more definite correlation between "educational" and "industrial" blindness than exists in England is promoted. The absence of a definition of blindness in the Scottish Act of 1890 is an advantage in this respect, and it may be that the existence of the definition of blindness in the English Education Act, 1921 would make it difficult to adopt the Scottish procedure in this

country, though, if it were adopted, the position would be much simplified and the definition would in fact be restricted to those children who can be educated only through the medium of Braille.

In view, however, of its substantial advantages we regard it as very desirable that the Board of Education should consider the possibility of adopting in this country the Scottish procedure of certifying for educational purposes partially blind children as "physically defective" and not as "blind."

Whether or not this course is practicable, the Committee are emphatic in condemning the application of the term "partially blind" to children falling in categories (b) and (c) on page 7. Various terms such as "partially sighted," "partially seeing," "visually defective," "visually handicapped," have been suggested to denote the children falling in these categories. None of these terms are free from objection. The first term "partially sighted," however, is already in common use and we have therefore adopted it as being the most convenient. It is a term which, in addition to describing the visual condition of these children, has the advantage of emphasising their residual powers rather than their disability. Throughout the rest of this Report, therefore, the term "partially sighted" will be used to designate the children falling within the scope of the Committee's inquiry, the term "partially blind" being reserved for those children who, though having a small amount of vision, are certifiable as blind persons under the Blind Persons Act.

"Partially sighted" children may therefore be grouped under the two categories named above :—

(b) those who on account of defective vision cannot follow the ordinary school curriculum, but can see well enough to be taught by special methods involving the use of sight; and

(c) those who are suffering from conditions such as myopia which may be aggravated by following the ordinary school curriculum.

B.—Historical Retrospect.

Prior to the establishment of special schools for the partially sighted the only specialised form of education available for partially sighted children was given in the Schools for the Blind. There is no evidence to show that before 1907 this form of education differed from that given to blind children. In other words, the education of partially sighted children was not treated as a special problem but was conducted either along lines applied to normally sighted children in the elementary schools or to blind children in schools for the blind. Yet the need for special educational facilities for partially sighted children was recognised. A former School Medical Officer for London (Dr. James Kerr) in his report for 1909 stated :—

"In analysing the work done under the late Authority in the Report presented to the Council in 1905, attention was

drawn to the considerable number of children with permanently damaged or diseased conditions of the eyes who are not blind and not ever likely to benefit by the training as given at Blind Schools, who may yet be actually harmed by the ordinary school education—children with diminished visual acuity—seen in cases with considerable corneal opacities, with chronically recurring phlyctenulae, with interstitial keratitis, old choroiditis, high myopia, congenital cataract, congenital absence of iris, some Albinos, and children with nystagmus The manifest incapacity of these children to follow the work of the elementary day school, both on account of the defect of their visual acuity, with or without glasses, and the grave risk of serious degeneration of what vision they have should they attempt such work, especially during their growing period, compels their withdrawal from ordinary class work. On the other hand it is equally futile to treat them as fit subjects for the Blind School.”

A differentiation in the educational curriculum of blind and of partially sighted children was first made in 1907, when the London County Council arranged to give instruction in reading and writing from large types at a distance of one metre, instead of in Braille, to children in their schools for the blind who were suffering from high myopia, but were not actually blind. In the same year the Local Education Authority for Nottingham adopted the policy of admitting highly myopic children to their Colville Street Blind School, where instruction in reading and writing from large type was given.

The establishment of the system of School Medical Inspection in 1908 and its development in subsequent years, leading to the ascertainment of a large number of partially sighted children in the Public Elementary Schools, brought a more general recognition of the fact that the education of such children was a special problem. The Chief Medical Officer of the Board of Education in his Report for 1909 on the Health of the School Child noted that several School Medical Officers had made reference to the question of the education of children who, while not having eyesight sufficiently defective to cause them to be treated as blind children, required nevertheless special methods of education.

The first special class for high myopes and children suffering from severe degrees of defective vision was established in 1908 by the London County Council in Boundary Lane School, Camberwell. This special class of 24 children constituted an intermediate group whose education was carried on jointly by the staffs of the elementary school and of the adjacent Blind School. For oral work the partially sighted children joined with fully sighted children; for manual work they received instruction from the staff of the Blind School; while literary work was taught in the Blind School, and included such part of the 3-Rs. as required the use of script and writing materials. The success which attended this scheme of special education for the

partially sighted led the London County Council to extend it to other districts, and in 1911 they received sanction from the Board of Education to establish special classes for an additional hundred partially sighted children. In applying for sanction the London County Council expressed the opinion that classes for these children should be held either in or in close proximity to the elementary school premises, as it was essential that the oral work should be taken with the fully sighted children. They pointed out that this arrangement would have the further advantage of rendering less likely the impression, which might otherwise be created, that the myopic child, although "educationally blind," was a blind child. By this proposal the London Education Authority showed that they had definitely adopted the policy of educating the partially sighted child as a sighted and not as a blind child. The initiation and development of this system of special education for partially sighted children in London, which gave the lead to the whole country, was due to the enterprise and foresight of Mr. Bishop Harman, ophthalmologist to the London County Council, and to Dr. James Kerr, School Medical Officer for London.

There is no need to trace in detail the gradual extension in subsequent years of special educational facilities for partially sighted children in England and Wales. Full information on this will be found in the annual Reports on the Health of the School Child by the Chief Medical Officer of the Board of Education. These reports show that the tendency has been to divorce the education of partially sighted children from that of the blind, but at the same time, by establishing special schools as self-contained units, to isolate it from that of normal children.

Special schools for partially sighted children were established with two objects in view; first, to preserve eyesight by preventing further increase in myopia, and secondly, to meet the needs of children who cannot see sufficiently well to benefit from education in the ordinary school, and yet will not fall within the scope of the Blind Persons Act. The first purpose often overshadows the second and the special educational methods devised for myopes now dominate the curriculum and are applied to all children whether myopes or non-myopes. This feature of the present-day special school for the partially sighted will be discussed later (see Chapter VI, pages 77-80, 87-91).

C.—Educational Provision for Partially Sighted Children in England and Wales.

Notwithstanding the gradual extension over the country of special educational provision for partially sighted children since 1908, many of these children still remain without its advantages.

We learn from the annual returns made by Local Education Authorities to the Board of Education that on 31st December, 1932, there were 1,952 partially sighted children in Public Elementary

Schools, 86 in institutions other than special schools for the blind or the partially sighted, and 242 at no school or institution. If we add to this total of 2,280 the 1,990 known to be in special schools for the partially sighted, and the 572* known to be in special schools for the blind, we get a total of 4,842 children known to be partially sighted. In Chapter II, Section B, it is estimated that the number of partially sighted children in England and Wales is approximately 6,000. If this estimate be correct it appears that there are about 1,200 partially sighted children unascertained, and it is probable that the large majority of these are receiving education in Public Elementary Schools. There is, therefore, a total of approximately 3,200 partially sighted children for whom no special education is provided.

The total number of special schools for partially sighted children in England and Wales is 37, giving a recognised accommodation of 2,030 places. These schools are provided by 22 different Local Education Authorities and all are day schools. Of these, London makes the most generous provision, having 11 schools with a recognised accommodation of 820, nearly half the special accommodation for partially sighted children in the country.

There are 27 schools for the blind which admit partially sighted children, though only 18 of them provide the special educational facilities which are necessary for this type of child. Seven of these schools are maintained by Local Education Authorities and the remainder are conducted by voluntary bodies. The majority of these schools are residential, 7 only of the 27 which admit partially sighted children being day schools. The total accommodation for partially sighted children in schools for the blind is not known, as the figure fluctuates with the number of blind children seeking admission, who naturally have first claim on the accommodation. It should be pointed out, however, that, owing to the success of preventive measures, the number of blind children is diminishing and, in consequence, the accommodation in schools for the blind exceeds the demand. The accommodation thus set free is utilised to a certain extent for partially sighted children, and in recent years the proportion of such children in schools for the blind has shown a tendency to increase. Even now, however, there are approximately 550 vacant places in schools for the blind. The question whether it is desirable to admit partially sighted children into schools which are primarily meant for blind children is a matter which will be discussed in Chapter IV.

As regards the 86 children returned as "at other institutions," the majority, if not all, are suffering from partial sight combined with other disabilities such as deafness, or mental or physical defects, and are in schools or institutions which deal primarily with the coincident defect. As regards their education,

* See page 47.

no doubt adjustments are made in the curriculum to suit their disabilities, but each must be regarded as an individual case and consequently a review of the special methods applied to them falls outside the scope of this survey.

Of the 242 partially sighted children reported to be "at no school or institution," the majority are probably suffering from other defects which render it difficult or impossible for them to gain admission to special or ordinary schools. In some cases objection on the part of the parents to their child being sent away to a residential school, coupled with inability on account of visual defect to profit by education in the ordinary school, accounts for non-attendance.

Assuming that our estimate of the number of partially sighted children in England and Wales (6,000) is approximately correct, we may summarise the position as follows; 4,800 of these partially sighted children have been formally ascertained: the remaining 1,200 have not been formally ascertained, though it is probable that the majority are known to the medical officers of the Local Education Authorities and receive medical attention for their defect. Approximately 2,600 are in special schools for the partially sighted or for the blind; 3,400 are in Public Elementary Schools, other institutions or in no school or institution.

It appears that in order to meet the problem of the education of partially sighted children in England and Wales, some further special educational provision is needed for rather more than 3,000 children. The nature of that special educational provision and how the need for it could be met is discussed in Chapters IV and V.

D.—Educational Provision for Partially Sighted Children in some other Countries.

In Scotland educational provision for partially sighted children is similar to that in England and Wales. Special schools have been established in several cities, the most complete provision being made in Glasgow, where there are four special schools—one residential which has separate classes for blind and partially sighted children, and three day schools admitting only the partially sighted—giving a total accommodation of approximately 300.

In Germany classes were started at Strasbourg, Mülhausen and Dortmund in 1911. The first class in Berlin was formed in 1919, whilst by 1932 there were in the same city 24 classes assembled in 3 schools, accommodating 350 children. In Dortmund there is now one special school of 5 classes with a total number on the roll of 58. Classes for partially sighted children are established in schools for the blind at Breslau and Hamburg.

In France partially sighted children are admitted to schools for the blind. At the Institut National des Jeunes Aveugles in Paris, for example, it is obligatory to adapt the teaching to the visual

capacity of the pupils. Plans are being made to establish a special class for these children in Paris.

The first special class for partially sighted children in Switzerland was established at Lausanne in 1925, and the second in Bâle in 1930.

In America the education of partially sighted children is conducted either in schools for the blind or in special classes associated with public schools. The consensus of opinion is strongly in favour of the latter system, and largely through the active encouragement and propaganda of the National Society for the Prevention of Blindness, a considerable increase in the number of special classes for partially sighted children in ordinary schools has taken place in recent years. This is illustrated by the following figures. The first so-called "Conservation of Vision" class was established in Boston in 1913, and another was organised in Cleveland, Ohio, in the same year. By 1932 the total number of special classes was 413, established in 119 different cities.

In Canada the position is similar. Although two schools for the blind make special provision for partially sighted children, it is the general opinion that where possible such children should be taught in special classes attached to the ordinary schools. Toronto was the first city to make such provision and 5 special classes were established. This system was later adopted by most of the larger centres of population, and by 1932 there were only 4 cities with a population of 50,000 and over which had no "sight saving" classes.

CHAPTER II.

OPHTHALMIC STANDARDS AND THEIR APPLICATION.**A.—Ophthalmic Standards for Selection of Children to attend Special Schools for the Partially Sighted.**

In Chapter I, Section A, we have described in general terms what children fall within the scope of the Committee's inquiry. We must now attempt to define the "partially sighted" in ophthalmic terms and to formulate ophthalmic standards to be applied in the selection of children who should receive specialised educational treatment.

Clinically, cases requiring special education fall into two groups :—

1. Those in which the primary cause of the defective vision is an error of refraction. The great majority of these cases are of myopia or myopic astigmatism.

2. Those in which the primary cause of the defective vision is :—

(i) inflammation resulting in scarring of the cornea, retina or choroid ; or

(ii) results of injury ; or

(iii) congenital defects, or

(iv) progressive degeneration of the optic nerve or retina.

Errors of refraction may occur in this second group but are not the primary cause of the defective vision.

1. ERRORS OF REFRACTION.**(a) *Myopia and Myopic Astigmatism.***

Myopia is by far the most important and frequent single condition which leads to admission to a Special School. In the schools for the partially sighted throughout the country the proportion of myopes ranges from one-third to three-quarters of the children in attendance. This being so it is necessary to consider in some detail the nature of myopia, the effect of the ordinary school or special school curriculum on its progress, and what constitutes a condition dangerous to eyesight, before we can formulate any standards for the selection of cases of this type for admission to a special school.

The physical factor producing myopia is in the majority of cases a lengthening of the antero-posterior axis of the eyeball. The precise cause of this aberrant growth is unknown. It may possibly be due to hereditary or racial factors, debilitating illnesses, over-use of the eye, or nutritional disorders such as calcium deficiency. At birth a child's brain and eye are developed far in advance of the body as a whole, and they grow very rapidly during the first year of life. At the end of the fourth year the brain and eye have

grown to about 80 per cent. of their full size, though the weight of the body is only 20 per cent. of its ultimate total. After the age of four the rate of growth of the eye slows down, though there is a gradual increase in size until the twentieth year. In some cases excessive growth of the posterior part of the eye occurs, causing a lengthening of the antero-posterior axis of the globe, with resulting myopia or short sight. In the majority of cases the abnormal growth soon stops and leaves a slight but permanent degree of shortsightedness. In other cases the process goes on perhaps up to the age of twenty or later, sometimes resulting in damage to the delicate tissues of the eyeball, recognised as "fundus changes." In such cases the resulting myopia is said to be progressive, although it is clear that all cases of myopia must at one stage be progressive.

The Council of British Ophthalmologists, in a Report issued a few years ago on "Standards of Vision for Candidates for Scholarships and Teacherships under Local Education Authorities," stated that in about 10 per cent. of the myopes at the school leaving age myopia becomes a serious defect and that in the remaining 90 per cent. the defect causes little inconvenience apart from the necessity for wearing glasses. Sir John Farsons, in his evidence before the Committee, was doubtful if sufficient data were available to justify any close estimate of the respective numbers of serious and slight cases. He agreed, however, that the majority of myopes fell within the category known as "educational", "innocent" or "physiological" myopia, a condition which might be regarded as a variation in development, and in which the eye seemed naturally resistant to the progress of the defect. Unfortunately, there is not yet enough clear knowledge of the origin or progress of the condition to differentiate at an early age between the cases which can be regarded as of this type and those which fall into the category of "pathological" or "malignant" myopia.

Myopia never, or very seldom, causes total loss of sight in children, though it may diminish visual acuity. At or about the age of fifty there may occur a gradual impairment and ultimate loss of central vision (reading and writing sight) due to disease of the macular region of the retina. In a few cases detachment of the retina occurs, leading to sudden loss of sight.

In an inquiry into the incidence of macular disease in cases of myopia, reference to which is made in the American Encyclopaedia of Ophthalmology (page 8269), macular disease was found in 218 out of 4,000, or 5·4 per cent., of cases of myopia. These serious complications are not necessarily confined to cases of myopia of high degree, as of these 218 cases of macular disease 49 had less than 10 dioptries* of myopia. Mr. Percy Flemming, a member

* A dioptre is a unit of refractive power. The refractive power of a lens is inversely proportional to its focal length. A lens with a refractive power of 1 dioptre has a focal length of 1 metre; a lens with a refractive power of 2 dioptries has a focal length of 0·5 metre, and so on.

of the Committee, has investigated the incidence of macular disease occurring in cases of myopia seen in the course of his private practice. The records of 264 consecutive cases, over 20 years of age, with myopia above 3 dioptries, were taken seriatim. Of these, 17 or 6·4 per cent. developed macular disease. In these 17 cases, the average age at which this complication occurred was 51, and the average degree of myopia at the time of occurrence was 12 dioptries. The visual incapacity caused by this condition in the 17 cases was as follows :—8 were unable to read, reading sight being lost at the ages of 40, 31, 55, 44, 80, 50, 40, 60 (in 3 of these cases the myopia was 7 dioptries or under); 7 could read J1* with the sound eye, at the ages of 64, 47, 31, 54, 60, 43, 37; one could read J2 at the age of 58, and one J4 at the age of 83.

The association of myopia and detachment of the retina is discussed at length in a monograph, "Detachment of Retina" by J. Ringland Anderson, published in 1931. It is there shown that about two-thirds of all retinal detachments occurred in myopes, and that about 3 per cent. of all myopes develop detachment of the retina. Further, although retinal detachment occurs more frequently in high myopes, it is not confined to them; it may occur in cases of myopia between 2 and 4 dioptries. Thus it appears that the factor in myopia which makes for retinal detachment, whatever its nature, may exist even in the low degrees of myopia. That it is not the same factor that causes progressive myopia is shown by the fact that retinal detachment is most common in myopes over 50 years of age, whereas the dangerous and progressive period of myopia is under the age of 30.

In the series of 264 cases of myopia investigated by Mr. Percy Flemming, 8 cases, or 3 per cent., of detachment of the retina occurred. In these, the average age was 67, and the average degree of myopia was 6·75 dioptries. The visual incapacity caused by this condition was as follows :—5 could read J1 with the sound eye, at ages of 30, 46, 42, 82, 74; 1 could read J6 with the sound eye; 2 were unable to read at ages of 55 and 60 respectively.

Certain cases in which myopia was a cause of blindness in early adult life are described in Appendix C, Section (3).

The degenerative changes mentioned above may occur in children, giving rise to visual disability, but detachment of the retina in children is a very rare occurrence.†

Although in the majority of cases a myopic eyeball is one with an unduly long antero-posterior axis, there are other cases in

* The test for near vision is carried out by means of types of different sizes devised by Professor Jaeger and known as J1, J2, etc. J1 is the smallest ("diamond") and J20 the largest. The bulk of this report is printed in approximately J10 ("11 point").

† Without minimising the seriousness of detachment of the retina, it may be pointed out that the prognosis as regards eyesight in retinal detachment has been improved during recent years owing to the introduction of a new operative technique.

which the myopia is due to changes in the lens and cornea of the eye. The myopia is of small amount and is not progressive. Such cases, therefore, may be excluded from the category of children who may require to attend a special school.

Myopia then in the large majority of cases is the result of faulty growth of the eye, and normally manifests itself in school life. The question to be considered is whether the conditions of ordinary school life encourage this faulty growth, and assist the processes which result in progressive myopia. It is commonly considered that faulty posture in reading and writing, poor illumination, and excessive convergence of the eyes, such as may occur in reading small print or doing fine needlework, play an important part in increasing myopia. In our ordinary Public Elementary Schools such factors producing eye-strain among children are only too common, and it is feared that faulty posture and poor illumination are not altogether unknown in special schools for the partially sighted. In the latter, however, more attention is given to the hygiene of vision; faulty posture in reading or writing is, or should be, corrected; work in poor artificial light is restricted; fine work, such as reading small print, and needlework, is eliminated. Moreover the Committee have had evidence from ophthalmic surgeons that rapid progress of myopia may be arrested if all close work be stopped, at the same time attention being given to general health.

On the other hand it should be noted that records of cases have come under the observation of the Committee in which a considerable increase in myopia has occurred in eyes which have had no reading sight for some years. (See Appendix C, Section (3).)

Dr. James Kerr, in his evidence before the Committee, estimated the average yearly increase of myopia in school children in the ordinary Public Elementary Schools as between 0·4 and 0·5 of a dioptré. An analysis covering some hundreds of scholars in myope classes showed the estimated advance as only about 0·25 of a dioptré.

Dr. McVail, Assistant School Medical Officer of the London County Council, carried out an investigation into the progress of myopia of children who had been in a special school over three years. (London County Council School Medical Officer's Report, 1927.) The number of cases was 104. The average period of attendance was 4·8 years and the age range was 5 to 14. The average increase was 0·27 dioptré per eye per year. In estimating the significance of this figure, however, it should be noted that it is based, not on examination by refraction, but on measurements of the strength of the glasses worn, the increase being determined by taking the difference between the means of the four meridians of the two lenses at the beginning and end of the period.

An investigation into the difference between the rate of progress of myopia in children attending ordinary schools and that in children attending special schools is described in Appendix C.

Section (1). In Section (2) of the same Appendix will be found a report of an investigation which was made on behalf of the Committee in certain large areas into the ophthalmic condition of myopes who had been educated at special schools and that of myopes who had been educated at ordinary elementary schools. From that report it appears that the rate of increase of myopia is for a few years greater in children after leaving the special school than in those who have left an ordinary school.

We may conclude that the régime of the school for the partially sighted, by the elimination or reduction of factors causing undue stress on the eyes, has some influence in decreasing or arresting the progress of myopia, but that this decrease or arrest is not always permanent.

Even if the conclusion that the special school régime "saves dioptries" be accepted, we have yet to consider how far it is justifiable in each particular case to withhold the advantages of a normal school life for the sake of saving a few dioptries of myopia. Some witnesses held that the educational restrictions imposed by attendance at a special school for the partially sighted were not justified by the results which they attained, and that the utmost damage produced in the majority of cases by attendance at the ordinary school would be an increase in the myopia to a degree presenting no serious handicap to a full and useful life. To take an example, applying Dr. Kerr's figure of the comparative increase of myopia in children, a child of 8 with 6 dioptries would at the age of 14 have reached 9 dioptries of myopia if he had attended an ordinary school and 7.5 dioptries if he had attended a special school. It may be argued that the mere saving of 1.5 dioptries of myopia does not justify the restriction in educational and social life which is necessarily imposed by the special school. This example is not intended to be a true clinical picture of what actually happens to individual cases, but is used merely as an illustration of what is meant by the term "dioptrie saving." Actually the problem is not nearly so simple. The rate of progress in one case may be very different from that in another of the same degree of myopia; periods of progress may alternate with periods of quiescence; marked progress may be associated with certain events in the child's life such as convalescence from debilitating illnesses or changes connected with adolescence. It is therefore very difficult to make a strict comparison of the progress in one case with that in another.

Notwithstanding that the simplest case of myopia must, at one stage of its development, have been progressive, the term "progressive myopia" is usually employed to designate a serious form of myopia, such as the cases referred to above as "pathological" or "malignant" myopia. What constitutes "pathological" progression in myopia? The obscurity of the various factors which appear

to affect this process makes it very difficult to answer this question, though in the opinion of most of the ophthalmic surgeons who have appeared before the Committee a case of myopia exhibiting an increase of more than one dioptré per annum is one which must be regarded as potentially dangerous. Some would admit such a case to a special school, setting all other considerations aside. Others would allow such cases to attend the elementary schools with restrictions on the use of their eyes, but subject to full re-examination every three or six months, allowing them to remain in the ordinary school if it seemed probable that the myopia would not be more than 7 to 9 dioptrés at the age of 16.

Owing to the complexity of this problem of myopia the Committee find it very difficult to lay down definite standards for the admission of myopes to special schools for the partially sighted. Witnesses are unanimous that every case must be judged on its own merits, a policy which leaves the selection of cases to the individual judgment of the ophthalmic surgeon in charge of the school, as at present. At the same time the Committee feel that there are certain guiding principles which should determine the selection of such cases and that there is need for more uniformity in applying them.

In deciding which cases should be sent to the special school, factors such as signs of degeneration of the fundus, rate of progress of myopia, degree of myopia present, age, family history and visual acuity must all be carefully weighed and assessed.

(i) *Fundus Changes in Myopia.*

It is generally agreed by ophthalmic surgeons that a myopic crescent with an irregular and ill defined edge indicates that the myopia is progressive. The width of the crescent is a measure of the extent of the progress and the nearer the edge of the crescent is to the macula the more serious is the condition. Other signs indicative of a serious condition of the eye are the presence of white and pigmented spots in the macular region and of floating opacities in the vitreous. The presence of any one of these signs is a definite indication that the child should be admitted to a special school.

The medical members of the Committee have examined a large number of ophthalmic reports on partially sighted children and are disappointed to find that many of these reports failed to give a detailed account of the condition of the fundus. For example, the presence of a myopic crescent is often recorded but its characteristics are seldom described. Yet, as shown above, a detailed description is important for estimating its significance. For example, a well defined myopic crescent means that for the moment the case is not progressive; it may be that progress has occurred in the past and is now arrested, or possibly the crescent may be congenital and therefore of no significance. The importance of recording carefully the

degenerative changes in the fundus and of estimating their significance has been emphasised by ophthalmic surgeons who have given evidence before the Committee.

(ii) *Progress of Myopia.*

As stated above, most of the ophthalmic surgeons who appeared before us agreed that a case exhibiting a progression of one or more dioptries of myopia a year must be regarded as potentially dangerous. The Committee, however, are of the opinion that such a case should not be admitted to a special school without very careful consideration of various factors which may be influencing progression, and without observation over a period long enough to determine whether progression is continuing at the same or at an increasing rate. Progress in myopia is not uniform. Rapid progress may occur during periods of convalescence from debilitating illnesses, and may be arrested as soon as normal health and vitality are regained. Periodical examination over a period of at least six months, in many cases much longer, is therefore necessary in order to determine whether the progress is constant and likely to result in danger to eyesight, or whether the myopia is merely in a temporarily active phase. While such a case is under observation the child may attend the Public Elementary School, though near work should be restricted. It may be advisable, particularly if the myopia is associated with subnormal conditions of health, to admit the child for a period to an Open Air School for Delicate Children, a matter discussed more fully in Chapter IV.

(iii) *Amount of Myopia Present.*

The amount of myopia present is again one of those factors the full importance of which can be assessed only when taken in relation to others. The Committee are not in agreement with the practice adopted in certain areas in this country and in America of necessarily sending cases above a certain degree to a special school. This principle is easy of application, but in our opinion unsound. A child aged 6 with 4 degrees of myopia showing steady progress may be in a much more dangerous position than a child aged 10 with 8 dioptries which is progressing but little. The mere determination of the amount of myopia present gives little knowledge about the case, except in so far as a high degree argues rapid progression at some time or another in the past; the amount is not of sufficient significance by itself to justify admission to a special school.

(iv) *Age and Family History.*

Age taken in conjunction with other factors is of importance. The younger the child the more serious is the prognosis. For example, one would take a more serious view of a child aged 5 or 6 with say 4 dioptries of myopia because of the probability of progression, than of a child of say 10 or over with the same amount of myopia. A family history of myopia is another factor which must

be taken into consideration in deciding upon the educational treatment of a case.

(v) *Visual Acuity.*

This is of relatively less importance in the case of myopia than in other conditions causing defective vision, for the majority of myopes after suitable correction have a fairly high degree of visual acuity and can read small print. It is therefore comparatively seldom that a myope with suitable glasses is unable to receive education in the ordinary school by reason of inability to see, provided, of course, there are no degenerative changes. But some cases of myopes even after correction can read only 6/24* or less, and such cases are suitable for a special school on account of loss of visual acuity alone.

We would also emphasise the importance of carrying out a near vision test. Myopes, even without correction, should be able to read J1 if they hold the reading matter close enough to the eyes. Inability to do so indicates either a high degree of astigmatism or degenerative changes in the fundus, and the need for a thorough ophthalmic examination.

Finally the Committee would emphasise the great importance of the careful and continued observation of all cases of myopia, whether of low or high degree, occurring in school children. For many of them adjustments in the ordinary school curriculum are all that is needed. Much could be done in this direction by the close co-operation of teacher and ophthalmologist. It is felt that in certain areas of this country many myopes are sent to special schools for the partially sighted who, with a modification of the curriculum, could continue in the ordinary school without detriment to their eyesight. It is not fair to deprive such children of the benefits of ordinary school life without being certain that under ordinary school conditions there is a danger of progression proceeding so rapidly that visual disability or ocular degeneration may occur in later life. In a few cases only, such as those showing definite signs of pathological myopia, can a final selection to attend the special school be made on the first examination. With the majority observation for six months or more, with repeated re-examination and careful estimate of the progress, is necessary before it can be decided that they are suitable cases to admit to a special school.

While the Committee are quite clear that *no hard and fast rules can be laid down and that every case should be treated on its own merits*, they are of the opinion that certain general principles for the selection of myopes for admission to special schools on the lines

* Snellen's Test for distant vision is made with a chart containing a number of letters graduated in size. The result of the test is represented by a symbol, for example, 6/24. This means that an individual standing at a distance of 6 metres from the chart can read only the letters which a normal eye can read at 24 metres.

suggested above can be formulated, and that it is desirable to formulate them in the hope of reducing the very wide divergencies in practice which exist to-day. These general principles are:—

I. If the eyes show fundus changes indicative of a serious condition of myopia the child should always be admitted to a special school. (See (i), page 20.)

II. In the absence of signs of such fundus changes the child should usually be admitted to a special school if:—

(a) after repeated examinations it is found that the myopia has been increasing steadily at the rate of more than 1 dioptré per annum;

(b) after a period of slow rate of increase or apparent arrest it is found that there is a sudden rise in the rate of progress to more than 1 dioptré per annum. (See (ii), page 21.)

III. The actual amount of myopia should not be the sole factor in determining whether a child should be sent to a Special School. (See (iii), page 21.)

IV. The age of the child must be taken into account. The younger the child the more serious are factors such as degree of myopia present and the rate of progress of that myopia. In doubtful cases the existence of a history of myopia in the family may be a deciding factor. (See (iv), page 21.)

V. Myopic children with a visual acuity after correction of 6/24 or worse should be admitted to a special school, though the majority of these will probably fall within category I above. (See (v), page 22.)

(b) *Hypermetropia and Hypermetropic Astigmatism.*

Hypermetropia is a condition in which the antero-posterior axis of the eye is too short. Most children up to the age of about 10 are hypermetropic. The error is usually slight in amount, tends to lessen, and finally disappears with the growth of the eyeball as age advances. Consequently it is of relative unimportance in considering which cases should be admitted to a school for the partially sighted, but hypermetropia of high degree, more particularly if associated with astigmatism, may be a cause of backwardness in school work, particularly on account of difficulty in seeing near objects. Even after the provision of correcting glasses, especially if this has been delayed until the age of eight, the child with high hypermetropia may be unable to make a satisfactory start in the ordinary school. Such children after correction of their vision need a certain amount of encouragement to use their eyes and to interpret the new retinal images. Facilities for this purpose should be provided in special schools for the partially sighted.

After a short period of such training vision should improve sufficiently to enable them to be transferred to the ordinary school.

2. DISEASES OF THE EYE.

The standards of selection of what we may call static cases of defective vision, due in most cases to sequelae of inflammation, such as corneal ulcers, keratitis and cataract, require consideration. Here the question of "sight saving" does not arise as it does in the case of myopia, for the conditions are permanent, and although the vision may improve as time goes on, as is revealed by a scrutiny of the records of such cases in special schools, this improvement is due more to psychological and educational factors than to a clearing up of the pathological condition. In contrast to the régime to which myopes are subjected, these cases should be encouraged to use their sight within limits, and this encouragement is more likely to be given in the conditions of the special school than in the ordinary school. In the selection of such cases to attend special schools for partially sighted children the most important, and practically the only, factor to be considered is visual acuity. It is not easy to lay down a definite standard of visual acuity and say that all children falling below that standard are unable to benefit by education in the ordinary school. Conditions vary much from school to school. In a school where the illumination is good, and where care is taken to place a child with visual disability at a suitable distance from the blackboard, it is quite conceivable that a child suffering from defective vision would receive full benefit from the education, while the same child in a school where less attention is given to these hygienic conditions would fail. Therefore we must again conclude that every case must be judged on its own merits, and, incidentally, on the merits or demerits of the ordinary school which the child attends. Generally speaking, it will probably be found that children with a visual acuity, after correction, of 6/24 or worse, with a near vision of J8 or J10, should be sent to a special school for partially sighted children.

The Committee are of the opinion that it is undesirable to admit children suffering from acute or sub-acute inflammations such as interstitial keratitis and phlyctenular disease into schools for the partially sighted. Interstitial keratitis while in the acute or sub-acute stage, often lasting as long as nine months to a year, needs hospital treatment, and harm would result from the pursuit of educational work involving any use of the eyes during that period. Children suffering from it should, however, be admitted to the special school when the acute or sub-acute condition has subsided and should be kept there until their visual acuity has improved enough to enable them to follow the ordinary school curriculum. Phlyctenular disease is associated with debility and ill health, and the treatment of the general condition should have prior claim. It is probable that the Open Air School for delicate children is a

better place for such cases, and this matter is discussed more fully in a subsequent section. (See Chapter IV, Section E.)

The question of admitting cases of optic atrophy to a special school for partially sighted children is somewhat controversial. The majority of such cases are progressive and eventually become blind. On the one hand it is argued that while sufficient sight exists the child should be educated as a sighted person; others claim that children who will eventually become blind should have at the earliest possible stage the benefits of methods of education applicable to the blind. The Committee take the view that those cases which are only slowly progressive, and which will apparently have a measure of useful sight for some years after the school leaving age, should be educated in schools for partially sighted children. Degenerative diseases of the retina, for example retinitis pigmentosa, exhibit as a rule a very slow progression, so slow as to justify the children being educated in schools for the partially sighted, even though there is a strong probability of eventual blindness. But it is essential that careful watch and records of the cases should be kept with a view to deciding, in the light of the rate of deterioration of vision, whether their retention in a school for the partially sighted is justified. This question is further discussed in Section C of this Chapter, and in Chapter IV.

B.—Ascertainment of Partially Sighted Children.

Section 52 of the Education Act, 1921 imposes the duty on the Local Education Authority to enable blind and deaf children in their area to obtain suitable education in a school certified by the Board of Education as efficient for this purpose. This obligation to provide suitable education for "blind" children (a term, as explained in Chapter I, Section A, which includes partially sighted children), implies an obligation on the part of the Education Authority to ascertain all the "blind" and "partially sighted" children in their area.

The complete ascertainment of exceptional children (who may be defined as those who on account of mental or physical disability cannot derive full benefit from education in a Public Elementary School) depends on the co-operation of many workers in the educational field. This is particularly true of the "partially sighted." Blind children of school age, namely, those classified under category (a) in Chapter I, Section A, who must be taught in special schools for the blind, are probably all known to the School Medical Officers, though not necessarily at the earliest possible age. The blind child at once becomes a problem in the ordinary school; his disability is obvious and consequently he is referred for medical examination at an early stage. The position of the child who is partially sighted or who suffers from conditions of eyesight which may become worse as time goes on, is rather different; his disability is not so obvious; he may make some, but not normal, progress in school work and although he fits badly into the ordinary

school system his retardation in educational work may not be so marked as to single him out from his fellows. Such cases are ascertained through the system of school medical inspection.

The system of school medical inspection in this country provides that all Public Elementary School children are examined on admission to school, at the age of 8 and at the age of 12. The first examination, which usually takes place between the ages of 5 and 6, does not, as a rule, include one of visual acuity, as subjective testing at that age is both tedious in application and unreliable in results. Cases of defective vision, therefore, may not be discovered until the second examination which takes place when the child has attained the age of 8. It is the usual practice of the teacher, however, to refer to the School Medical Officer any children who appear to be unable to benefit fully by attendance at the ordinary school, and among these will be partially sighted children. It is often the teacher, therefore, who takes the first step in the ascertainment of children suffering from marked visual disability.

The weakness in the present scheme of ascertainment of defective vision in school children by means of the system of school medical inspection is referred to in Chapter 4 of the Report on the Health of the School Child for the year 1932 by the Chief Medical Officer of the Board of Education. In this Report School Medical Officers are urged to investigate the practicability of making a test of visual acuity of the children at an earlier age than is done under the present system and the Committee wish to endorse this advice.

Notwithstanding their limitations, the arrangements described above should ensure that all cases of defective vision arising in early school life are ascertained not later than the third year after entering school. Those arising later will be discovered at the routine inspection of older age-groups, or may be referred by school nurses or teachers to the School Medical Officer.

The next problem is to divide these cases into those who, after treatment, can receive education without handicap or detriment in the ordinary school, and those whose visual defect renders it necessary for them to be educated in a special school for the partially sighted. The ophthalmic principles which should govern the selection of the latter have been fully discussed in the preceding section. The application of them calls for special knowledge and experience in ophthalmology. It is essential therefore that the selection of children for admission to a special school for the partially sighted should be made on the principles set out above and only by specialists in ophthalmology.

It has already been pointed out in Chapter I, Section C, that there are 4,842 partially sighted children in England and Wales who are known to require some special form of education. There are good reasons for believing that this is an under-statement of the position. We have already noted that under the present system of medical inspection some partially sighted children under the

age of eight may not be brought to the notice of the School Medical Officers. Again, many children in the schools for the partially sighted are allowed to leave at the age of 14 instead of 16 which is the school leaving age for exceptional children laid down by legislation. The figure given above does not therefore include many who are between 14 and 16 years of age and these should be added to the total number of partially sighted children of school age. Ascertainment in certain areas is incomplete for a variety of reasons which will be discussed later, and though in some areas more children are returned as partially sighted than would be placed in that category were the Committee's standards of selection applied, the total ascertainment for the country as a whole is probably lower than the figure which would be obtained on the basis of these standards.

The varying standards adopted by different Local Authorities in designating children as "partially sighted," and the lack of uniformity and completeness in the returns made to the Board of Education by different Authorities of the number of children considered to come within this category, make it very difficult to determine the number of partially sighted children in England and Wales who are in need of special educational provision. It is however important to make an estimate of this number in order to determine what is the nature and extent of the special educational provision needed, even if such an estimate must lie between considerable limits. To do this it is necessary to consider the returns of partially sighted children from a number of individual Authorities, to discuss reasons for the variation in the relative number of such children in those areas, and to try to deduce an incidence figure based on the Committee's standards of selection laid down in the previous Section.

The following Table gives the number of partially sighted children ascertained in certain County Boroughs.

Number of Partially Sighted Children ascertained in various County Boroughs.

County Boroughs.	No. of Children on P.E.S. Registers, 31. 3. 33.	No. of Partially Sighted Children ascertained, 31. 12. 32.	No. of Partially Sighted Children per 1000 on P.E.S. Registers.
Area A	575,090	883	1.54
" B	56,155	69	1.23
" C	142,428	163	1.14
" D	143,243	153	1.07
" E	49,949	149	2.98
" F	37,465	189	5.04
" G	113,446	151	1.33
" H	29,231	4	0.14

We will first consider the position in County Boroughs whose figures show extreme variation from the mean. In area F, where there is ample provision, it has been the policy to admit practically all myopes, even those of low degree, to the special school. All such children are "ascertained" as partially sighted and consequently the incidence figure is higher than that returned by any other Authority. In area H, on the other hand, there is no special provision for partially sighted children. The Authority, therefore, not unnaturally, are reluctant to ascertain as "blind" those children who, in default of special provision, must be educated in the ordinary schools. Generally speaking, in the absence of special provision for education there is a lack of incentive to ascertain. Area G, however, is an exception to this rule; it has no special school for the partially sighted, yet the incidence figure is higher than that of certain Authorities that have special schools. It is known that the standards of ascertainment applied in area A bring considerably more myopes under the category of partially sighted than those applied in areas B, C and D; those applied in area B include rather more myopes than those in areas C and D. The Committee have had evidence from the ophthalmic surgeon of area C, and are satisfied that the ophthalmic principles governing his ascertainment of partially sighted children approximate to those formulated by the Committee in the previous Section. In area C it is the practice to retain the majority of partially sighted children in special schools until the age of 16, while in areas A, B and D the majority of such children leave the special schools at 14. This fact partly accounts for the discrepancy between the incidence of partially sighted children in C and D and at the same time makes the difference between the figures of C and of B and A relatively greater. The return from area E is of interest, and by the courtesy of the School Medical Officer, who has supplied full clinical details of the cases recorded as "partially sighted," the Committee have been enabled to investigate the position fully. Records of 132 partially sighted children, giving the nature of the defect, the degree of myopia, if present, and the visual acuity were examined. Eighty of these cases were myopes, 52 were non-myopes. Of the 132 children, 28 had records which would, on the application of the ophthalmic standards laid down on pages 23-25, have caused them to be excluded from the "partially sighted" category. They consisted for the most part of children with myopia of under five dioptries and a visual acuity after correction of 6/18, or of children with defective vision due to causes other than myopia who, after correction, could read 6/18. If we exclude the 28 children from the Authority's return the incidence of partially sighted children in area E is 2.5 per 1,000 on school registers. Out of the 132 partially sighted children there were a further 25 who, according to the Committee's standards, would be doubtful cases. They were for the most part children who had myopia of

five or more dioptries, but after correction had a visual acuity of 6/18 or better. In the absence of knowledge of the rate of progress of myopia in these cases, it is not possible to say whether or not they come within the Committee's standards for the determination of partially sighted children. The exclusion of these 25 doubtful cases in addition would bring the incidence of partially sighted children in area E down to 1·9 per 1,000 of children on the school registers, a figure considerably higher than those of areas B and C. Areas C and E are large sea-ports, and it might be expected that their inhabitants would be fairly comparable in character, social status and conditions of employment. We must conclude, therefore, that even after applying the Committee's standards, the number of partially sighted children in area E represents a true variation in incidence which is definitely higher than that of areas B and C.

The returns of the number of partially sighted children in county areas show variations which are even more difficult to explain. The following figures show the incidence of partially sighted children in certain county areas.

Number of Partially Sighted Children ascertained in various Counties.

Counties.	No. of Children on P.E.S. Registers, 31. 3. 33.	No. of Partially Sighted Children ascertained, 31. 12. 32.	No. of Partially Sighted Children per 1,000 on P.E.S. Registers.
Area I	69,036	21	0·30
„ J	80,149	45	0·56
„ K	75,213	61	0·81
„ L	56,297	44	0·78

As a rule it is found that the figures returned of partially sighted children in rural areas fall below those of the more thickly populated urban areas. There are several reasons to account for this. Often in rural areas the ascertainment of exceptional children in general, and of partially sighted children in particular, is not so complete as in the more concentrated school populations of cities and towns. Medical services are more diffuse and children have to travel longer distances for ophthalmic examinations. Again, with the exception of London and Essex, County Authorities do not provide special schools for the partially sighted. The completeness of ascertainment is inevitably influenced by the extent of special provision. Children who, on account of seriously defective vision, are unable to make any headway in the ordinary schools are sent, in the absence of a special residential school for the partially sighted, to a residential school for the blind. The par-

tially sighted child who is sent to a school for the blind is usually nearer the borderline of blindness than the child who is ordinarily admitted to the day special school for the partially sighted. Consequently there is a tendency on the part of County Authorities, and indeed of all Authorities who have no special school available for their partially sighted children, to tighten up their standards of ascertainment and to return as partially sighted only those children who, on account of severe visual defect, are quite unable to benefit by the ordinary school curriculum.

The figures were discussed with the School Medical Officers and ophthalmic surgeons of certain of the County Authorities mentioned above. The ophthalmic surgeon of area I holds the opinion that, provided the child with myopia is prevented from doing fine work and that he reads books only in the largest type available, there is seldom need to make special educational provision. He is prepared, however, to recommend special educational treatment for the young child whose myopia is found to progress more than one dioptré a year, or for a myopic child who is unable to read 6/36 after correction, a rare occurrence in myopia. He would seldom recommend the removal of a non-myopic case from an elementary school. Holding these views he naturally returns a small number of children as partially sighted.

In area K the standards are not so rigid. A myopic child would be considered as partially sighted if the myopia progressed 2 to 3 dioptries in two to three years, or if the visual acuity was less than 6/24. The same standard of visual acuity would determine also the inclusion of the non-myope. In area J similar ophthalmic standards are applied. In this county we are dealing with a population rather above the average in social and economic status, and it is possible that the incidence of diseases causing defective vision is low.

In area L all myopes of 7 dioptries or more are returned as partially sighted, little account being given to rate of progress. Non-myopes, of whom there are very few, would be returned as partially sighted if their visual acuity was 6/24 or worse.

Thus the standards for the designation of myopic children as "partially sighted" are influenced mainly by the views held by the particular surgeon on myopia, the conditions favourable for its development and the causation of complications involving failure of sight. Some ophthalmic surgeons hold that the ordinary school curriculum is definitely harmful to the myopic child; others hold that, no matter what adjustments are made in the educational curriculum, the myopia continues to increase. Those holding the last opinion would be reluctant to return myopes as partially sighted children unless diminution of visual acuity made admission to a special school desirable. Further, the variation in practice of different ophthalmic surgeons with regard to the correction of myopia by glasses has an influence on the number of children considered to be in need of special education. Some correct fully and

obtain the best visual acuity that is possible under the circumstances. Others deliberately under-correct, with the result that the visual acuity for distance may not be brought up to the standard which would take the children out of the "partially sighted" category. Again, as has already been explained, the standard of selection of partially sighted children by the ophthalmic surgeon is influenced by the extent to which special educational provision is available. The Committee are not prepared to give an opinion to what extent, if any, there is a real difference in incidence in different areas. This is a matter which needs further investigation, for at present we have no definite knowledge either of the comparative incidence of myopia or of the relative importance of various conditions causing defective sight in different localities.

The variety of factors which influence the ascertainment of partially sighted children in different areas renders it very difficult to estimate, from the figures submitted by those areas, the total number of such children in the whole country. The Committee have given careful consideration to the standards of selection applied in different areas, in relation to their own standards formulated in Section A of this Chapter. It seems probable that were the Committee's standards applied in certain areas, particularly those which have special schools, the number of children who would be designated as partially sighted would be smaller than that shown in the returns made to the Board of Education; in other areas a selection of partially sighted children based on the Committee's standards would result in an increase in the number of such children found. In view of the figures quoted in the foregoing Tables it seems reasonable to suggest that the proportion of partially sighted children in England and Wales, if selected on the basis of the Committee's standards, would be not less than 1 per 1,000 children on the school registers,* representing approximately the figure of 6,000.

* In connection with these figures it may be interesting to quote the results of a survey of the public schools of Philadelphia, U.S.A., by Dr. S. Weir Newmayer, with a view to determining the number of children who need education in special schools for the "semi-blind". Among 210,000 of ages between 6 and 16, Dr. Newmayer found 200 children who could be classed as "semi-blind" (partially sighted), an incidence of 1 per 1,000.

Professor M. Bartels of Dortmund, in a paper read before a Conference of the International Association for the Prevention of Blindness, held at Paris in November, 1932, estimates the number of children needing the advantages of special education because of eye conditions as one or two per thousand school population.

In a paper on "Sight Saving Classes in Germany and Austria" by Peter C. Kronfeld, M.D., Associate Professor of Ophthalmology (University of Chicago), read before the Illinois Society for the Prevention of Blindness, in December, 1932, the author states, "From statistical reports we have reason to believe that the relative frequency of those children who do not see enough to attend regular school but see well enough to be taught with visual methods is the same all over the world. The figures so far reported run from 0.1 to 0.25 per cent of all school children."

C.—Ophthalmic Problems relating to the transfer of children from Special Schools for the Partially Sighted back to ordinary Schools, or to Special Schools for the Blind.

1. TRANSFER OF CHILDREN FROM THE SPECIAL SCHOOL FOR THE PARTIALLY SIGHTED TO THE ORDINARY SCHOOL.

In the first section of this Chapter we have discussed the ophthalmic principles which should govern the selection of children for admission to special schools for the partially sighted. We have now to consider the converse, namely, the ophthalmic principles which should be applied in the transfer of children in special schools for the partially sighted back to ordinary schools, or, in the case of further deterioration of vision, to special schools for the blind.

The Committee are of the opinion that the question of the transfer of children in special schools for the partially sighted back to the ordinary schools does not in certain areas receive the careful attention it deserves. Once a child is admitted to a special school there is too great a tendency to keep him there for the remainder of his school life. There is evidence that a number of children who, on account of improvement in vision or arrest of the progress of myopia, could finish their education in the ordinary school without handicap or danger to eyesight, are retained in the special school until school leaving age. If a child becomes fit for education in the Public Elementary School he should not continue to be subjected to the inevitable limitations of the special school.

The ophthalmic standards of selection of children to attend special schools for the partially sighted, discussed in Section A of this Chapter, give an indication of the considerations which should influence the ophthalmic surgeon in deciding whether a child is fit to be transferred back to the ordinary school. We therefore deal briefly with this subject under the headings used in the previous Section.

(a) *Errors of Refraction.*

(i) *Myopia and Myopic Astigmatism.*

The most important factor which must be taken into account in deciding whether a case should be transferred back to the ordinary school is the progress of myopia. If progress has been arrested, and that arrest appears to be permanent, a trial at the ordinary school should be made. The complexity of the various factors which appear to affect progress and the irregularity of the progress itself, however, render it difficult to decide when the myopia has been arrested, and it is advisable to defer any definite action until it has been ascertained that the progress in myopia does not exceed 0.5 dioptré over a period of a year.

The presence of marked pathological changes in the retina indicates that the myopic process has advanced to a dangerous stage, and associated with them will probably be marked visual disability. It is unlikely, therefore, that the question of transfer to the ordinary school will arise in such cases. On the other hand, the presence of a myopic crescent, showing signs of previous spreading but now well defined, may indicate that progress has been arrested, and may be a useful sign in determining whether or not the case is static.

Other factors, such as age, family history, amount of myopia present, must be taken into account, but only in so far as they affect the more important factor of progression. For example, myopia in a child 6 years of age is less likely to be permanently arrested than in a child of 10.

(ii) *Hypermetropia and Hypermetropic Astigmatism.*

The decision whether a child with hypermetropia should or should not continue to attend a special school for the partially sighted should be based on one factor only, viz., visual acuity. As stated in the previous Section, such children need to be "encouraged to see." Training in the use of the eyes often effects an improvement in the visual acuity within a comparatively short time. Examination of records of hypermetropic children in attendance at special schools indicates that an improvement, say from 6/24 to 6/12 or even more, may be expected within a year or two. An increase in the visual acuity sufficient to allow the child to be educated without handicap in the ordinary school, or an acuity of 6/18 and an ability to read J4 or better, should be sufficient indication for transfer. Unless astigmatism is present, an improvement in visual acuity in cases of hypermetropia at special schools appears to be the normal course, and few, if any, of these cases, unless there are coincident diseases or abnormalities, need to be retained in special schools through their school life.

(b) *Diseases of the Eye.*

In those cases where the disease has ceased to be active, visual acuity is from the ophthalmic standpoint the only factor to be considered. An improvement to 6/18 or better should be sufficient indication for a trial in the ordinary school. Many of the cases in which visual disability is the result of past inflammation improve while in attendance at the special school. Scars on the cornea may become less opaque, while at the same time the children learn to use their defective sight and to interpret the blurred images more accurately. The corneal opacities resulting from interstitial keratitis may gradually clear, leaving in most cases a fair degree of visual acuity. On the other hand, visual disability due to congenital defects or to degeneration of the optic nerve, retina or choroid is permanent and in many cases progressive. Consequently

for these children attendance at a special school for partially sighted children will be necessary throughout school life, and the question of transfer back to the ordinary schools is unlikely to arise.

Reports have been made to the Committee by School Medical Officers in charge of special schools for partially sighted children on the eye conditions of children who have been transferred from special schools for the partially sighted to ordinary schools. Myopia which has become stabilised is by far the most frequent condition found in these cases. Other conditions are scarred corneae, interstitial keratitis, hypermetropia and hypermetropic astigmatism and phlyctenular disease, in which the visual acuity had improved after a few years in the special school.

It is essential, more particularly in cases of myopia, that examination by an ophthalmic surgeon should take place at periodic intervals of not less than six months after the children have been sent back to the ordinary school. The visual acuity and condition of the eyes should be fully assessed and reported on, and any deterioration in vision or signs of increase in myopia are indications that re-admission to the special school should be considered. To effect this it is necessary to have some co-ordination between the work done by the ophthalmic branch of the School Medical Service and that in the special schools, a linking up which can be brought about if the same ophthalmic surgeon be appointed in charge of both. Such co-ordination is usually effected in areas where the school for the partially sighted is provided by the Local Education Authority, but it is more difficult to secure in areas where the Authority make no special provision themselves but send the children to special schools outside their own area.

2. TRANSFER OF CHILDREN FROM A SPECIAL SCHOOL FOR THE PARTIALLY SIGHTED TO A SCHOOL FOR THE BLIND.

A certain number of children in schools for the partially sighted, owing to further deterioration in vision, are transferred to schools for the blind; a certain number of former pupils of schools for the partially sighted eventually become blind and are admitted for training into blind workshops.

An inquiry addressed by the Committee to Medical Officers in charge of schools for the partially sighted reveals that the most frequent conditions causing the transfer of a partially sighted child to a school for the blind are high myopia, progressive disease of retina and choroid, optic atrophy, retinitis pigmentosa, albinism, relapsing interstitial keratitis and congenital cataract. Similar ophthalmic conditions may result in blindness supervening within a few years after the child has left the school for the partially sighted. For example, Liverpool reports that during the last ten years 15 ex-pupils of special classes for the partially sighted have been registered as blind persons at the age of 16 or over. The

following is a summary of the ophthalmic conditions from which they suffered :—

Retinitis Pigmentosa ...	...	...	...	...	7
Optic Atrophy ...	...	...	...	...	2
Myopia ...	...	...	...	...	2
Myopia with Coloboma	...	...	...	...	1
Myopia with Coloboma and Nystagmus	...	...	...	...	1
Interstitial Keratitis ...	...	...	...	...	1
Zonular Cataract ...	...	...	...	...	1

The ophthalmic surgeon of the school for the partially sighted has a heavy responsibility towards cases of the types mentioned above. It is essential that he should keep close observation on them, examine them at intervals of not less than six months and report to his Authority those who by reason of deterioration in vision can no longer benefit by sighted methods of education, and those who, though having sufficient sight to carry on in the school for the partially sighted, are likely to become certifiable as blind on leaving, or within a few years of leaving, school. There can be no question as to the proper course to take with regard to the former. If their sight is so defective as to render them unable to profit from education by partially sighted methods, they should be transferred to a school for the blind forthwith. The question with regard to the transference of children who can see sufficiently well to be educated by modified sighted methods, but who in all probability will become in the near future certifiable as blind under the Blind Persons Act, is a controversial one which will be dealt with more fully in Chapter IV.

CHAPTER III.

MEDICAL CARE AND SUPERVISION OF PARTIALLY SIGHTED CHILDREN.**A.—The Ophthalmic Supervision of Partially Sighted Children and its relation to the Ophthalmic Service of the Local Education Authority.**

In Chapter II, Section B, we have shown that the ascertainment of partially sighted children is but a part of the larger problem of ascertaining the number of school children who are suffering from defective vision. Similarly the supervision and treatment of partially sighted children are but a part of the work undertaken by the ophthalmic service of a Local Education Authority in the treatment of children suffering from defective vision.

The ophthalmic service of a Local Education Authority is a branch of the School Medical Service, which provides for the inspection of school children and for the treatment of certain special defects including diseases of the eye and defective vision. As executive chief of the School Medical Service stands the School Medical Officer, who has on his staff a number of Assistant School Medical Officers and specialist officers, frequently including an ophthalmic surgeon. These specialist officers are advisers to the School Medical Officer, but they act in an executive capacity also in so far as they carry out the treatment of cases falling within their particular sphere. While in some areas all cases of defective vision are treated by the ophthalmic surgeon, in others the majority are treated by the School Medical Officer or his assistants, who refer to the surgeon only the cases presenting special difficulty. There are, however, certain duties falling within the scope of the ophthalmic branch of the School Medical Service which should always devolve upon the ophthalmic surgeon. He should treat the more complicated and difficult cases of defective vision. He should keep under close and continued supervision those children for whom admission to a special school for the partially sighted must be considered, and the final selection of children for admission to a special school should not be made without his advice. He should be responsible for the ophthalmic supervision of the children throughout their special school life, noting any change for better or worse. If there is improvement, return to the ordinary school should be considered, though even if this transfer is made the children should remain under ophthalmic supervision. If there is further deterioration in vision the question of transfer to a blind school arises. Under a fully co-ordinated system the ophthalmic surgeon to the Local Education Authority should also be certifying officer under the Blind Persons Act.

This ideal system is by no means impracticable, and is in fact in operation in certain areas in the country, and in partial operation in the majority. Most of the Education Authorities who maintain special schools for the partially sighted have as their consulting

ophthalmic surgeon for the special school the officer who holds a similar position in their School Medical Service. In rural districts, however, it is much more difficult to arrange that the ophthalmic surgeon of the special school is also the ophthalmic surgeon of the Local Education Authorities which send children to that special school. In rural, as in urban, areas it is the duty of the Authority's ophthalmic surgeon to decide which children are to be regarded as partially sighted, but if special education is provided it usually involves the children being sent away to a residential school where supervision is carried out by the ophthalmic surgeon of that school. The children do not as a rule come again under the ophthalmic surgeon of their Local Education Authority unless at some later date they are transferred back to the ordinary school.

The primary duty of the ophthalmic surgeon in relation to children in special schools for the partially sighted is to examine, report and advise on them at periodic intervals. It should be laid down as a general rule that each child be fully examined every six months, though more frequent observation may be necessary for certain individual children. The examination should include testing of near and distant vision, retinoscopy and inspection of the fundus.

Close co-operation between the head teacher of the special school and the ophthalmic surgeon is necessary if each child is to receive the widest, and at the same time the safest, education possible under the limitations imposed by his disability, and it is of the greatest importance that the curriculum should be designed and applied with this end in view. It is regrettable that in the majority of schools for partially sighted children at present little or no difference is to be found in the educational treatment of myopes and non-myopes—a state of affairs which in the opinion of the Committee is indefensible either on ophthalmic or on educational grounds. It should be the duty of the ophthalmic surgeon, in the light of his findings at the periodical examinations, to advise the head teacher on what modifications of the curriculum, such as the extension or curtailment of close work or of physical exercises*, should be made from time to time in each individual case.

More general questions relating to the hygiene of the classroom* should also be a matter for consultation between the ophthalmic surgeon and the head teacher. These include lighting, both natural and artificial, the kind of furniture, the size of print, the materials used in writing, and the use of special apparatus such as the epidiascope.

The ophthalmic surgeon must also have in mind the future of the child after leaving school. What type of work in the locality is suitable for children with partial sight? Has the child sufficient sight to enable him to follow his proposed employment? Is it likely that a particular job will cause further deterioration in

* See also Chapter VI.

vision? While of course the Local Education Authority cannot forbid a partially sighted child to take up unsuitable work on leaving school, they can, through their School Medical Officer and ophthalmic surgeon, offer valuable advice to individual children.

Though the Committee are not in favour of the policy of admitting partially sighted children to schools for the blind,* they recognise that on certain grounds of expediency such a course is under present conditions sometimes unavoidable. The ophthalmic supervision and treatment of children in an institution which admits both blind and partially sighted is a matter of exceptional responsibility. It is the duty of the ophthalmic surgeon of the school to advise which children should be educated along the lines of "blind" education and which by "sighted" methods, and to modify his advice, if necessary, in the light of his findings at periodical examinations. Skilled, conscientious and regular supervision of individual cases by an experienced ophthalmic surgeon is therefore essential, if each child is to receive the type of education best suited to his particular defect. Furthermore, the ophthalmic surgeon alone is in a position to judge whether the child at the end of his elementary school period is likely to be eligible for the benefits of the Blind Persons Act, or will have sufficient sight to render such certification improbable.

B.—Attention to the General Health of Children in Special Schools for the Partially Sighted.

Under Section 80 of the Education Act, 1921 the duty is imposed on Education Authorities to make suitable and adequate arrangements for the medical inspection of children in Public Elementary Schools and for attending to the health and physical condition of such children. As we have explained in Chapter II, Section C, general medical inspection takes place on the child's entry to school at the age of five, on attaining the age of eight, and on attaining the age of 12. Though these provisions apply to the partially sighted as well as to normal children, it is the practice to keep the former, and indeed all "exceptional" children, under closer and stricter medical supervision. A yearly medical examination on the lines indicated in the schedule of routine medical inspection, covering nutrition, the circulatory, respiratory, digestive and nervous systems and the special senses is, or should be, carried out. Any defects found are referred for treatment either by a medical attendant of the parent's own choice, or through the facilities provided by the Local Education Authority. The Authority, under the duty imposed by Section 80 of the Education Act to attend to the health and physical condition of elementary school children, make arrangements for the treatment of certain defects, such as minor ailments (skin diseases, external diseases of the eye, etc.), visual defects, and diseases of the ear, nose, throat and

* See also Chapter IV, Section B.

teeth. Apart from their value to the individual child, these services may have some bearing on the wider problem of the prevention of blindness and defective vision. It is generally held to-day that certain diseases of the eye, particularly phlyctenular disease, which may lead to permanently impaired vision, are associated with focal sepsis in the tonsils, nasal cavities and teeth. The early detection and treatment of inflammatory disease at the minor ailments clinic, and the eradication of septic foci in the tonsils, nose and teeth, carried out under the school medical service by Local Education Authorities, may be important factors in preventive ophthalmology.

Though it is true that partially sighted children who are in special schools have been under close medical observation, there is little or no published information as to how their general physique and health compare with those of ordinary children. General physique, nutrition and posture are matters deserving more attention than they appear to receive at present. We know that the limitation of normal physical activity in blind children, by reason of their inability to pursue it except under care and escort, results in sub-normal nutrition, postural defects and lowered physique in a considerable number of these children. Whether a similar, though less crippling, disability leads to the same result among the partially sighted we have no information. Short sight may compel children to look closely at objects and so may lead to postural deformities, such as round shoulders and spinal curvature; conversely such deformities, which may primarily be due to weak back muscles, necessitate peering and may thus be a factor in increasing myopia. These considerations emphasise the need for close medical observation of the general health and physique of partially sighted children. This matter is more fully dealt with in Chapter VI, pages 87-92.

Apart from the visits for routine medical inspection, the medical officer should be in constant touch with the school in order to detect and treat any cases of disease, more particularly external eye disease, which may arise. A small room in the school, stocked with simple dressings, lotions and ointments, should be available as a minor ailments clinic. Children can then be treated on the spot instead of having to travel to the nearest school clinic—a journey which, for partially sighted children, may require an escort.

The nurse's duties in the ordinary school consist mainly of surveys for the detection of children who are suffering from conditions due to uncleanliness, or from minor ailments such as skin diseases, inflammatory conditions of the eye, discharging ears, etc., following them up in their homes and influencing the parents to obtain proper treatment. Similar services are necessary in a day school for the partially sighted, and there is a very important duty in addition. The nurse should see that children are wearing their own spectacles, that the glasses are kept clean and in good order and that in the event of a breakage immediate steps are taken to effect a repair. It is very important to secure the co-operation of the teacher in matters relating to the use and proper

care of the children's spectacles. If a clinic is available on the school premises the nurse's duties will include a certain amount of skilled treatment prescribed and supervised by the medical officer, such as simple dressings, irrigations of the eye, or application of ointment.

The dental services provided by the Local Education Authority for public elementary school children are made available to the partially sighted children. Children should be inspected by a dentist at least once a year and steps taken to ensure that every case of oral sepsis or dental caries receives adequate treatment.

The provision of a midday meal, for which it is customary for parents to pay according to their means, is one of the usual advantages of the special school. Meals have an important bearing on the general health of the children and therefore on the condition of their eyes, particularly in cases of myopia and phlyctenular disease. The provision of a meal at school also prevents hardship to children who live too far away to enable them to return home for their midday dinner. For these reasons midday meals should be provided in all special schools for the partially sighted, and suitable accommodation, such as a dining room, kitchen, etc., should be available for this purpose. The dietary should be drawn up in consultation with the School Medical Officer.

Another factor in the promotion of the general health of exceptional children, particularly children in a special Open Air School, is the provision in the time-table for a midday rest of three-quarters of an hour to an hour's duration. Such an arrangement does not as a rule form part of the régime of special schools for the partially sighted, though there is no doubt that for a certain number of partially sighted children who are below normal in physique and nutrition, or who are growing too fast, a midday rest would be very beneficial.

There may be present in the special school, as in other schools, some exceptionally ill-nourished or subnormal children for whom special treatment is required. These should be the subject of special attention and investigation by the medical officer, who may prescribe treatment in the form of provision of extra milk or of cod liver oil.

C.—Co-operation between School and Home in the care of the sight of Partially Sighted children.

The restrictions which are imposed on the use of the eyes for near work in the special school for partially sighted children can be enforced for only six or seven hours a day on children attending day schools. Out of school a child can, and unless controlled will, pursue activities which will undo much of the good which may result from the precautions taken in the special school. He may read badly printed matter in poor light, adopt bad postures, pursue occupations necessitating near use of the eyes, and indulge in games and exercises which for myopes may constitute a danger. If the

special school is to exert any real influence on the preservation of sight it must secure the active co-operation of the parent in all out-of-school activities.

The first step to secure this co-operation must be taken even before the child is admitted to the special school. As soon as it is decided that a child is a candidate or potential candidate for a special school the parent should be fully informed of the ophthalmic condition. In a personal interview the school medical officer or ophthalmic surgeon should explain to the parent the educational handicap and the dangers caused by the particular condition and the reasons why a specialised form of education is desirable. A verbal explanation should be reinforced by printed or typewritten notices explaining in simple language the nature of the visual defect and, if the child is myopic, giving reasons for certain restrictions in activity which are desirable during the child's growing period. Matters such as the wearing of spectacles not merely in school hours but at all times, the need for reporting to the clinic immediately if the glasses are broken, and the precautions to be taken in reading, writing and physical exercise should be dealt with. A few typical examples of notices to parents are given in Appendix D. Success in arousing the interest and sympathy of the parent will do much to overcome any prejudice which may exist against a child being placed in a special category and admitted to a special school for the partially sighted.

Once a child is in a special school, direct co-operation between the teacher and the parent is the most effective means of extending to the home the precautions taken in the school. Parents should be encouraged to visit the school to see the work done and to consult with the Head Teacher. "Open days" should be arranged, though these are less effective than the more informal and intimate relationship between the teacher and parent which can be secured by personal interviews. Parents should be invited to be present at the examination of their children by the School Medical Officer, and by the ophthalmic surgeon, when information concerning the progress of the case and more detailed advice on any precautions which are necessary can be given.

An important link between the school and the home should be the school nurse. It is essential that the special school should be visited frequently by the school nurse, whose duties in this connexion have been described in the previous section. She should be cognisant of any special precautions which may be needed in individual cases. She should be present at the periodical medical and ophthalmic examinations, in order to receive detailed instructions from the School Medical Officer or ophthalmic surgeon as to the régime of individual cases. She should visit the homes of the children to see that any precautions advised by the medical officers are carried out and should generally help parents in maintaining conditions which are necessary for the conservation of vision.

For partially sighted children educated in residential schools the unknown and uncontrolled factors in home life are of course eliminated to a very large extent. Co-operation between home and school is necessary, however, in order that the precautions taken during school life may not be relaxed during the holidays. Relations between parent and teacher cannot be so close as in day schools because the majority of children come from a distance, but parents should be encouraged to visit the school on "open days," when an opportunity for consultation with the Head Teacher should be given. Any special precautions advised by the ophthalmic surgeon to the school should be notified to the Local Education Authority responsible for the child, and home visits by the school nurse of that Authority should be paid during the holidays in order to ensure that those precautions are carried out.

D.—Provision of After-care Arrangements for the Ophthalmic Supervision of Children who have left Special Schools for the Partially Sighted.

The supervision of health by the School Medical Service ceases when the child leaves school, i.e. for the majority soon after the age of 14. The National Health Insurance Scheme provides medical advice and treatment for insured persons aged 16 and over. There is usually, therefore, a period between leaving school and becoming insured during which neither the care of the School Medical Service nor the benefits of the National Health Insurance Scheme are available. As far as ophthalmic supervision and treatment are concerned this deficiency in an organised service is especially serious, for with the exception of a few public agencies which will be mentioned later, there is no provision for the treatment of diseases of the eye and defective vision from State-aided sources.

Although the school leaving age of children in special schools is legally 16, a large number of children in special schools for the partially sighted do in fact leave at 14*. The ophthalmic supervision to which they have been subjected while in attendance at the special school then ceases abruptly. Yet this is a critical period in a child's life, especially if he is a myope. Changes due to adolescence are occurring, the myopia is not yet stabilised, and at the same time the child enters a new sphere of activity in which competition for employment, and new and unaccustomed work of perhaps considerable physical strain are involved. Emergence from the sheltered life of the special school may have important psychological and physical effects, which in their turn may have some influence on the disability from which these children suffer. The need for skilled ophthalmic supervision during this period is therefore urgent.

We have to consider what agencies, State-aided or voluntary, exist to carry on the ophthalmic care of partially sighted persons,

* On this point see Chapter V, page 68, and Chapter VII, page 121.

and how far those various agencies can be co-ordinated to produce a more comprehensive system of ophthalmic supervision than exists at present.

First must be mentioned the arrangement made by certain Local Education Authorities to maintain the supervision of partially sighted children until the age of 16, even if, as often occurs, the children are allowed to leave the special school at the age of 14. Continued supervision is sometimes secured in such cases by the Authority withholding permission to leave at the earlier age unless the children continue to attend the school clinic for ophthalmic examination up to the age of 16.

Co-operation between the Juvenile Employment Bureau or similar organisations and the School Medical Service is a factor in the welfare of partially sighted children. Recommendations by the ophthalmic surgeon with regard to the most suitable forms of employment or to future ophthalmic supervision and treatment are sometimes passed on to the Employment Bureau, which in many areas acts not only as an agency for securing employment but as an organisation to advise on the general and medical welfare of young persons.

The system of medical inspection of young entrants to employment by certifying factory surgeons, and the establishment by many large and progressive firms in this country of comprehensive medical services, are agencies which have some influence in promoting the ophthalmic supervision of partially sighted children between the ages of 14 and 16. Young employees between the ages of 14 and 16 who come under the provisions of the Factory Acts must be examined by an approved certifying factory surgeon. The service provides for examination only, solely to decide the employees' suitability for their particular employment.

Medical schemes established by certain firms provide as a rule for the examination of young employees between the ages of 14 and 16, and for the treatment of certain defects, including defective vision. Ophthalmic treatment may be given by an ophthalmic surgeon, to whom the firm's doctor refers cases, or, when merely eye-testing and provision of glasses are required, the services of an optician are sometimes utilised.

The services mentioned hitherto deal, for the most part, with young persons between the ages of 14 and 16, and, with the exception of the Factory Welfare schemes, they do not provide ophthalmic treatment to persons over the age of 16. Under the National Health Insurance Scheme, however, ophthalmic treatment may be given to insured persons by arrangement with the National Ophthalmic Treatment Board, provided the Approved Society gives ophthalmic benefit. This benefit is limited to an examination of the eyes and the provision of glasses at a reasonable cost. The activities of the National Ophthalmic Treatment Board include

non-insured persons in their scope, but they do not by any means cover the whole country, nor do they provide for continued ophthalmic supervision, which is necessary for partially sighted persons.

The only organisations which can provide a comprehensive system of periodical supervision and skilled treatment of partially sighted persons above the age of 16 are the Ophthalmic Hospitals or the Ophthalmic Departments of General Hospitals, which may be voluntary or under the control of the Local Authorities.

In a previous section we have spoken of the need for linking up the ophthalmic work of the special school with that of the School Medical Service, the co-ordinating link being the ophthalmic surgeon in charge of both. We should like to see co-ordination carried one stage further and the ophthalmic service under the Local Education Authority linked up with that of the hospital. Such co-ordination can be effected when the ophthalmic surgeon of the hospital is also on the staff of the Local Education Authority, a condition which exists in many areas. Under such a scheme it is possible to arrange for the same ophthalmic surgeon to follow the child throughout school life and to continue supervision at the out-patient clinic of the Hospital during early adult and adult life. Again, certain Local Education Authorities, notably London, arrange for the ophthalmic examination and treatment of school children with defective vision, including of course partially sighted children, to be undertaken in the out-patient departments of general hospitals or ophthalmic hospitals. It needs but little organisation to enable those same hospitals to carry on the supervision of the partially sighted after they have left school and have entered early adult life.

Though the ophthalmic services provided by Local Education Authorities are no longer available after a child leaves school, the powers given to County Councils and Local Authorities (except London*) under Section 66 of the Public Health Act, 1925, could, if invoked, give such supervision without restriction as regards age. Under this Section the Local Sanitary Authority and the County Council have power, with the consent of the Minister of Health, "to make such arrangements as they may think desirable for assisting in the prevention of blindness and in particular for the treatment of persons ordinarily resident within their area suffering from any disease of or injury to the eyes."

The power to establish schemes for the ophthalmic supervision of partially sighted persons after they have left school exists, but there is a definite need that these powers should be utilised more fully, and that the work of the various agencies which might form component parts of such schemes should be co-ordinated.

In addition, much can be done during school days by inculcating in the child a sense of responsibility with regard to his own well being, and in the syllabus of Health Teaching emphasis should be

* The London County Council is not included in this Section.

laid on the necessity of remaining under skilled ophthalmic supervision after school life. Much can be done, and is done, by Head Teachers in keeping in touch with ex-pupils and inducing them to attend hospitals for periodical examinations. It has been found practicable in certain areas for Home Teachers of the Blind to visit partially sighted persons who have left school and to induce them to continue their treatment. The Almoner's Departments of the large Ophthalmic Hospitals in this country exercise a supervision over these and similar cases which is unfortunately limited by the multitude of calls upon their varied activities. Where practicable, an Almoner does herself visit cases whose attendance at the out-patient department has been unsatisfactory or who have ceased to attend before the completion of treatment, but more often such visiting is undertaken at the Almoner's request by voluntary workers attached to various charitable or other bodies. In certain cities of America a somewhat different plan has been adopted to follow up in their homes cases attending the out-patient department of an Ophthalmic Hospital. The out-patient department has on its staff a "social worker" whose duty it is to visit cases on the Hospital's books and to ensure their attendance at the requisite intervals. The development of this plan has engaged the attention of the American National Society for the Prevention of Blindness and experiments have been carried out in training and placing workers specially suited to undertake this form of social service.

The Royal London Ophthalmic Hospital (Moorfields Eye Hospital) makes an organised attempt to extend into post-school years the supervision of myopic children attending there. Many school children from neighbouring counties such as Essex, Kent and Surrey attend as ordinary patients. Myopic children are entered on a special register and are notified by the Hospital Almoner when re-examinations are due. If a child of school age does not attend, the Local Education Authority concerned are notified in order that a school nurse may follow up and induce the child to come to the hospital for examination. After the child has left school, following up is carried out by visitors of the local Blind Association or by voluntary social workers, who are notified by the hospital almoner of cases in need of continued ophthalmic supervision.

The Committee regard the establishment of schemes to secure continuous ophthalmic supervision of partially sighted children after they have left school as a matter of the highest importance, and are of the opinion that, given good will and co-operation between the various public and voluntary agencies involved, an effective and efficient system could be provided to cover the country. We have been glad to learn that the Prevention of Blindness Committee set up by the Union of Counties Associations for the Blind have this problem under active consideration.

CHAPTER IV.

TYPES OF EDUCATIONAL PROVISION FOR THE PARTIALLY SIGHTED.

A.—The Special School for the Partially Sighted.

Special educational provision for partially sighted children in England and Wales is made for the most part in day special schools which are self-contained independent units. They have their own teaching staff, in many cases separate premises and playgrounds, and they pursue an educational course founded on, but conducted entirely independently of, that of the ordinary school. If the school contains more than one class it is generally established in separate premises, while the one-class special school, sometimes loosely termed a "special class," is usually formed within the curtilage, sometimes within the building, of a Public Elementary School. Special schools are administered under different Grant Regulations from those governing ordinary schools.

There are 37 day special schools, with a total accommodation of 2,030, for partially sighted children in England and Wales, maintained by 22 different Local Education Authorities. None are provided by voluntary bodies. Of the Local Education Authorities that of London makes the most generous provision, having 11 schools with a recognised accommodation of 820, nearly half the special school accommodation for partially sighted children in the country.

As may be expected from the proportion of partially sighted children, estimated at 1 per 1,000 of children on the Public Elementary School registers, there is only a small number of Local Education Authorities which have a school population large enough to need a special school of more than four classes for partially sighted children. Even when the school population is sufficiently large it is frequently scattered over so wide an area that by reason of distance and cost of transport it is found desirable to assemble partially sighted children in two or three small schools suitably situated to meet the needs of various districts, rather than in one school large enough to take all such children in the area. Consequently the majority of day special schools for partially sighted children contain one or two classes only. The following table shows the number of schools with the number of classes :—

*Number of Classes
in each School.*

Number of Schools.

6	...	...	...	...	...	...	1
5	...	...	...	...	...	...	1
4	...	...	...	...	...	...	3
3	...	...	...	...	...	...	10
2	...	...	...	...	...	...	10
1	...	...	...	...	...	...	12

37

The average number of children per class is 22·7. The average number of children per one-class school is 18.

It will be seen from the foregoing that the education of partially sighted children is conducted for the most part in small scattered units. The limitations as regards academic and social education imposed by such a system will be discussed more fully in Chapter V.

Although, as stated above, special schools are often established within the curtilage of the Public Elementary School, they are regarded as independent of the ordinary school in almost every area. There is as a rule no difference between the special class assembled in, but independent of, the ordinary school and the self-contained special school. In Liverpool, however, the special schools for partially sighted children are regarded as an integral part of the ordinary elementary school in which they are established. Liverpool has six special classes for partially sighted children, two being assembled in one Public Elementary School, two in another Public Elementary School, one in a third Public Elementary School and one in a special open air school for delicate children, an arrangement which will be referred to again in Section E of this Chapter. The essential feature which distinguishes this system from others in the country is that the classes and staff for partially sighted children are under the control and supervision of the Head Teacher of the Public Elementary School in which those special schools are established. This system may be described as one of "non-segregation," in contrast to that in which the special schools are independent units and which may be described as one of "segregation." A full description of the working of the system of non-segregation and a discussion of the relative merits of the two systems will be given in Chapter V.

B.—The Special School for the Blind.

Excluding the Secondary Schools, schools for children with multiple defects, and schools which deal only with children under the age of five, there are 33 schools for the blind in England and Wales, giving a total accommodation of 2,506.

Eleven of these schools, with a total accommodation of 500, admit day scholars only; they are maintained by nine different Local Education Authorities; none are conducted by voluntary bodies. There are in addition seven residential schools which admit day scholars.

The number of partially sighted children in schools for the blind is 572, as shown by the following Table:—

—	Accn.	No. on Roll.	Blind Children.	Partially Sighted Children.	Special arrgts. for Partially Sighted Chn.
11 Day Schools	500	414	207	207 (7 schs.)	7 schs.
22 Residential Schools.	2,006	1,666	1,301	365 (20 schs.)	11 schs.

In the seven Day Schools which admit partially sighted children the proportion of these to the total number of children on the roll is about 70 per cent. Certain of these schools have so high a proportion of partially sighted children that they have become almost exclusively schools for the partially sighted. Only four day schools restrict admission to children falling within Category A (see Chapter I, Section A), i.e. those who, having no perception of light or having extremely defective vision, cannot be taught by methods involving the use of sight.

In all the day schools for the blind which admit partially sighted children such children are grouped into special classes and their education is organised apart from that of the blind.

As regards the residential schools, fifteen are conducted by voluntary bodies and seven by Local Education Authorities. Twenty of them admit partially sighted children, though only eleven make special arrangements for their education by modified sighted methods; in the remaining nine residential schools partially sighted children are educated as blind children.

The total number of partially sighted children in schools for the blind is 572, a figure representing over 27 per cent. of the children on the rolls. It is easy to explain the reasons for this considerable proportion of partially sighted children in schools for the blind, a proportion which has been increasing year by year. The preventive measures undertaken by Public Health Authorities in recent years, particularly against ophthalmia neonatorum, have resulted in a diminution in the incidence of blindness in children of school age. There is therefore an insufficient number of blind children to occupy the available accommodation in schools for the blind. As spare accommodation exists in these schools it has naturally come about that the School Managers have been glad to accept partially sighted children to fill vacant places, while many Authorities, having no other special provision for the partially sighted, have sent them to these schools rather than leave them in the ordinary Elementary Schools, in which they are too handicapped to receive the full benefits of education. Even among the large urban Authorities there are some who have not yet established special day schools for the partially sighted. In rural and small urban areas it would be almost impossible for the Authority to make such provision owing to the small numbers of children involved and the difficulties of transport. If the policy of admitting partially sighted children to schools for the blind is continued, any further decrease in the number of blind children would result in the proportion of partially sighted children in such schools increasing still further. It is important, therefore, at the present time to review the policy of educating partially sighted children in close association with blind children.

An investigation into the ophthalmic records of children attending residential schools for the blind shows that there are approximately 110 partially sighted children in those schools for whom

no separate educational provision is made. Though in all probability these children will never be certified as blind under the Blind Persons Act, they are being educated by methods which should be applied only in the education of the blind, and they are thus thrust into a "blind" world during their school life. This practice is indefensible. The children are taught by methods which will not fit them for post-school life, and on reaching 16 years of age they are turned out into the sighted world ill-equipped educationally and socially, and bereft of the assistance which is available for registered blind persons. The Committee emphatically condemn such a practice, which they regard as a deplorable failure in educational administration, causing in many cases mal-adjustment and hardship to partially sighted children and adolescents.

The weight of evidence from both English and American witnesses is opposed to the admission of partially sighted children into schools for the blind under any conditions. The late Dr. Eichholz pointed out that it is a fundamental fact that the partially sighted person belongs socially, psychologically, educationally and industrially to the sighted world. He suggested that harm had been done to the partially sighted by associating them with the totally blind, and that there were no compensating advantages. Another witness, Mr. Edward Evans, pointed out that there was often at the beginning a violent antipathy on the part of parents to their partially sighted children associating with the blind. Other witnesses expressed the opinion that the admission of partially sighted children to a school for the blind creates a prejudice against the former which acts disadvantageously, particularly when the child at the age of 16 enters the labour market. Similar opinions are expressed with the same degree of emphasis in the Report of the White House (U.S.A.) Conference on Child Health and Protection, 1932. This Report points out that the partially sighted child who has been taught with the blind is liable to find after-school adjustment in the life of the world of the seeing unnecessarily difficult.

This evidence presents a cogent case against the admission of partially sighted children to schools for the blind. The case is even more convincing if the school is a residential one for, except during holidays, the child never emerges into a sighted world as the day school child does out of school hours. Finally, all the arguments (which are fully dealt with in Chapter V) against the policy of segregating partially sighted children from fully sighted children apply *a fortiori* to educating them with the blind.

While the Committee sum up against the general policy of admitting partially sighted children to schools for the blind, there are certain children for whom this measure is not so open to condemnation. These are partially sighted children who have sufficient sight to enable them to be educated by modified sighted methods but who, on account of probable further loss of vision, are

likely to be registered as blind persons at or about the age of sixteen. Their number is not negligible. In the residential blind schools alone there are approximately 50 out of 1,500 children. Should such children be educated as sighted persons while their sight renders this possible, or should they be educated by methods suitable for the blind as soon as it is known that they are likely to lose their sight within a few years? If they are to be educated as sighted persons then the proper place is a special school for the partially sighted; if as blind persons then a school for the blind.

Some witnesses, viz. the late Dr. Eichholz, Mr. F. W. Smith and the late Mr. J. Herbert Fisher, were of the opinion that while partial sight is retained the child should be regarded from all angles as a sighted person. On the other hand, Dr. Livsey of Liverpool was on the whole in favour of transferring the partially sighted child who was almost certain to become blind, to a blind school, though often on sentimental grounds and in order to "let the case down lightly" his practice was to retain the child in a class for the partially sighted so long as the child could profit by the education given there, irrespective of what the prognosis might be.

There is much to be said for both these views, and it is no easy task to decide between them. On the one hand it is urged that so long as a child has sufficient sight to enable him to profit by instruction by sighted methods, every opportunity should be taken to teach him by those methods and to postpone as long as possible the time when his training or education can be carried on only by the necessarily more restricted methods suitable for the blind.

On the other hand it is claimed that if a child's after-school life is to be lived in the community of the blind, he should be given in the blind school the education best calculated to fit him for that community, as soon as it is certain or highly probable that he will be blind before or soon after the age of 16.

It is not to be expected that there will be many cases where the ophthalmic surgeon will be prepared to commit himself to a definite prognosis that a child will be blind before the age of 16. There are however a number of cases where an ophthalmic surgeon will advise that there is a high probability of blindness by that age. In deciding in each case whether to advise the admission of a partially sighted child to a blind school to be taught by blind methods, we suggest that the ophthalmic surgeon should be guided by this principle, on which the Committee, after careful consideration, are agreed: it is more harmful to a partially sighted child to have been taught by blind methods in a blind school if at 16 he proves not to be entitled to the benefits of the Blind Persons Act, than it is for a partially sighted child who does prove to be entitled to those benefits at 16 to have been taught in some other school than a blind school. The ophthalmic surgeon should, therefore, err, if at all, on the side of keeping a child in the educational world

of the sighted as long as possible. No partially sighted child should be sent to a blind school, when there is a choice between such a school and a partially sighted school, unless he is one of whom it can be said that there is a certainty, or at least a very high probability, that he will be certifiable under the Blind Persons Act by the age of 16. If the prognosis shows that he is unlikely to be certifiable under that Act for some three or four years after the age of 16, the Committee think the balance of advantage lies clearly in retaining the child to the end of its school life among the sighted. An intelligent person should find no difficulty in learning Braille after leaving school, and in any case the disadvantage of postponing this task is in our view not to be compared with the disadvantage of changing the fundamental process of his education before the period of school life is complete.

If the principle of admitting partially sighted children to schools for the blind be condemned, what alternative can be offered to provide for the education of those children who by reason of visual defect are unable to benefit fully by instruction in the ordinary schools? In large urban areas no difficulty need arise. In Chapter V it will be shown that in the Committee's view the ideal educational provision for partially sighted children is the special "non-segregated" class in the ordinary school.

In rural and small urban areas this ideal can rarely be attained, and if partially sighted children are to receive a special education there is no alternative to sending them to residential schools. If however the principle that no partially sighted child should go to a school for the blind is accepted, it follows that the residential school should be one reserved exclusively for partially sighted children. There is no such residential school at present in this country. We therefore recommend that the Board of Education should carefully consider whether by some reorganisation of the existing residential schools for the blind certain of these schools could not be set apart for partially sighted children only.

There are at present about 365 partially sighted children resident in schools for the blind. This number is of course much smaller than the total number of partially sighted children in rural and small urban areas; moreover there are a large number of vacant places in schools for the blind. Some reasons why more partially sighted children are not sent to schools for the blind are no doubt to be found in the high cost of residential provision, in parents' objections to their children being sent away, and in the doubt felt by many people whether the school for the blind is a proper place for a partially sighted child. Consequently only those children whose vision is so defective that they are quite incapacitated from obtaining any benefit from education in the ordinary school are being sent to special residential schools for the blind. In other words, the partially sighted children sent to residential schools for

the blind are as a rule nearer the border line of blindness than those who would be sent to a day school, were such available.

It appears to the Committee therefore that, despite the growth of appreciation of the needs of partially sighted children, the number of such children sent to residential schools is never likely to show a substantial increase. On the assumption that provision should be available for, say, 600 partially sighted children in residential schools the needs of such children in rural and small urban areas would be met if three or four of the existing schools for the blind in different parts of the country were set apart for partially sighted children. In making this suggestion the Committee realise that there are administrative difficulties, the chief of which probably are the terms of the Charitable Trusts under which voluntary schools for the blind are conducted. Moreover, the fact that there is a smaller sentimental appeal in "partially sighted" than in "blind" would probably have considerable weight with the authorities of a school which is partially supported by voluntary contributions. In view, however, of the very material benefits to the partially sighted which would result from setting apart certain residential schools for them the Committee earnestly hope that by co-operation between Local Education Authorities and Voluntary Bodies some regional re-classification of the schools in question may be found possible, even though Trusts may have to be altered to secure it.

Even if such re-classification prove feasible, a considerable time must necessarily elapse during which the present practice of sending partially sighted children to schools for the blind will continue. In order to minimize the educational disadvantages to the partially sighted child under these conditions, the Committee earnestly hope that the Board of Education will take immediate steps to require that schools for the blind should admit or retain partially sighted children only if special provision is made for their education by sighted methods. The nature of such provision must depend on the number of partially sighted children in the school. Separate classes should be formed if the number of children is large enough to permit suitable classification by age and attainments. If the numbers are too small for this, partially sighted children should be distributed among the classes throughout the school; it is essential however that if partially sighted and blind children are taught in the same class, the education of the partially sighted should be carried out by sighted methods.

C.—The Ordinary Public Elementary School.

In those areas where the population is too small or too scattered to enable special provision to be made for partially sighted children either in an ordinary Public Elementary School or in separate

premises, there is no alternative to sending the child to a residential school except to keep it in the ordinary school.

The annual returns made to the Board of Education show that there are 1,952 partially sighted children receiving education in the ordinary elementary schools. In Chapter I, Section C of this Report it is estimated that there are also about 1,200 children who, though not notified to the Board as such, are partially sighted, and are being educated in the ordinary schools.

The isolated partially sighted child in the ordinary school constitutes an individual problem which may be solved to a greater or less degree by various adjustments made within the school itself. The success of these adjustments depends on many factors, such as the size of the school, the provision of special teaching material, the personal interest taken by the teacher in the individual child, and co-operation between the ophthalmic surgeon and the teaching staff.

In Chapter III, Section A, we have described the arrangements for the medical care and ophthalmic supervision of partially sighted children in special schools, and the relationship of these arrangements with the ophthalmic service of the Local Education Authority. As, generally speaking, the ophthalmic branch of the school medical service is well developed and efficiently organised over the whole country, the partially sighted child who does not go to a special school is not necessarily deprived of satisfactory ophthalmic supervision and treatment. We feel assured that the great majority of partially sighted children, including those who are not notified to the Board of Education as such, do receive the necessary supervision and treatment under the Local Education Authority's ophthalmic service.

The adjustments which are made to help the partially sighted children to obtain the maximum benefits from the curriculum of the ordinary elementary school should be subject to the advice of the ophthalmic surgeon and the School Medical Officer. It is, therefore, essential that there should be close co-operation between these officers and the school teachers. Several Local Education Authorities issue leaflets to teachers indicating what should be done to assist children suffering from severe defects of vision and what particular activities of the ordinary school curriculum may be harmful to myopes. Adjustments can be made in all schools which may be of considerable help to the partially sighted child. For example, consideration can be given to the child's position in the classroom. The partially sighted child should be placed in the front row or at such distance from the blackboard that he can see writing on it without effort. Attention should be given to his position in relation to natural and artificial lighting. Posture is also an important matter. Children should not be allowed to peer at or stoop over work at the desks. All these precautions are matters of general classroom hygiene, applicable alike to partially sighted and to fully

sighted children. In the matter of position as regards the black-board and the lighting, however, it is obvious that the former should have preferential treatment.

Certain modifications in the educational curriculum and in educational methods to meet the special needs of partially sighted children can be made in the ordinary elementary schools. Only books of clear and suitably sized type* should be allowed, and, in the case of myopes, the period for reading should not exceed 20 minutes† without a break. In cases of high myopia, it may be advisable for special materials for writing, e.g. blackboards and crayons, to be provided, and for certain subjects, such as fine sewing and practical instruction involving use of the eyes for near work, to be excluded from the curriculum.

Such adjustments will enable the majority of partially sighted children in the ordinary elementary schools to gain some benefit from the education given there with a minimum of risk to their sight. There are however a few children having low degrees of visual acuity or suffering from rapidly progressive myopia, who can derive little benefit. It is from children of this type that the partially sighted classes in residential schools for the blind are recruited—a matter which is discussed in Section B of this Chapter.

D.—The Secondary School.

London is the only Authority which has established special classes for partially sighted children in its Secondary Schools. In 1926 the London County Council approved a scheme for the award of special scholarships at Secondary Schools for pupils who were successful at the ordinary scholarship examination but did not pass the medical examination owing to defective vision, and also to assist pupils from myope schools, who had shown evidence of exceptional ability, to enter upon a Secondary School course. Special classes for such pupils were instituted in September, 1926, at Raine's Foundation School for Boys (12 places), Clapton Secondary School for Girls (33 places) and Peckham Secondary School for Girls (26 places).

Recommendations were made by the ophthalmic staff of the Authority with regard to the modifications and restrictions in the ordinary Secondary School curriculum which should be applied to partially sighted pupils. These are set forth fully in the Report of the School Medical Officer for London for the year 1926. They include restrictions in the period for reading (children should not be allowed to read more than half an hour at a time, and the total time should not exceed one and a half hours a day; between half hour periods there should be an interval of at least an hour); homework and sewing are prohibited; the use of special materials for writing is recommended; modifications in the Physical Training syllabus are also imposed. The children are allowed to participate with fully sighted children in all lessons which can be regarded as of an oral character, the work in the special class being largely supplementary

* See Chapter VI, pages 81–84.

† See Chapter VI, page 80.

to and explanatory of that given in the ordinary class. Typewriters are largely used for writing, the "touch" method being enforced by conditions which make it impossible for children to see the writing.

The experience of the London County Council has shown that even under these restricted conditions pupils can be educated sufficiently to be successful in public examinations, provided that the ordinary examination arrangements be slightly modified. In 1929 three girls from the Clapton Secondary School entered for a General Schools Examination—writing large script and being allowed five minutes' rest at the end of each hour—and all three gained Honours Certificates with three distinctions each.

The results which attended these special classes in Secondary Schools led the London County Council to make similar arrangements in Central Schools, and in 1928 special classes with accommodation for 40 children were formed in the Ensham and Hugh Myddelton Central Schools.

In evaluating the success of the London provision we must keep in mind the type of case which is admitted to the special classes in the Secondary Schools. The large majority are children who have been educated in the ordinary schools, as their defects in vision have not been regarded as sufficiently serious to require their admission to a special school. Comparatively few children have passed from the elementary special school to the Secondary School, and they were accepted for the latter only if their educational attainments and progress justified it and their eye condition was not likely to deteriorate through the more constant study necessary under the Secondary School curriculum. The children in the special classes in London Secondary and Central Schools, therefore, are highly selected, both from the educational and the ophthalmological points of view. As a group they are not comparable as regards defective sight with those in the elementary special schools for the partially sighted. Their visual defect is not so advanced, nor is their myopia of such a high degree. In other areas the majority of these children would be subjected to an unmodified curriculum in the Secondary School. A few might be refused admission to Secondary Schools on the ground of defective sight or a condition of sight which might be aggravated by Secondary School conditions, but as far as our information goes, cases refused by Authorities who have no special provision would probably also be refused by the London County Council, who have special provision.

While recognising the value of the London County Council's experiment in devising special arrangements for the education of myopic children in the Secondary Schools, the Committee would point out that no other Authority has yet seen fit to adopt a similar system of special classes. The number of children for whom such provision is necessary is small, and only the largest urban areas would find a sufficient number to justify the formation of a special secondary class. By means of a questionnaire the Committee have

consulted the ophthalmic surgeons and School Medical Officers of nearly all these areas on matters relating to the secondary education of partially sighted children. Except in three of these areas ophthalmic considerations alone would not prevent a partially sighted child from entering a Secondary School, though in the others high myopes are discouraged from pursuing a secondary education. In areas which have a special elementary school for partially sighted children, it is comparatively seldom that a child in such a school attains a sufficiently high educational standard to justify admission to a Secondary School, though it is by no means so clear that there are not some children whose intelligence would enable them to profit by a Secondary School education. From the replies it is evident that, beyond certain minor adjustments in the curriculum, such as the curtailment of home work, special arrangements for the secondary education of myopes and other partially sighted children are not considered necessary. The ophthalmic surgeons consulted have little or no evidence that the unrestricted curriculum of the Secondary School has proved directly responsible for deterioration in the vision of myopic children attending it. It appears, therefore, that even in areas where the number of partially sighted children is large enough to warrant the establishment of a special class in a Secondary School, the ophthalmic surgeons have not felt that the risk of deterioration in eyesight is great enough to justify substantial restriction in the Secondary School curriculum. That there is some risk the Committee would not deny, though it may well be doubted whether attempts to restrict the curriculum of the school are really effective in minimising that risk. There would almost certainly be a strong tendency for the partially sighted child who had sufficient mental ability and application to gain a scholarship into the Secondary School to disobey the regulations of the school and to make up by means of independent work at home, often carried out under unsatisfactory conditions, the leeway which might result from restrictions placed on the curriculum. Moreover the psychological effect of severely restricted school life on partially sighted children who have been clever enough to gain a scholarship must not be overlooked. They are singled out as "exceptional," and for this reason some develop a sense of inferiority, some become a prey to anxiety about their future, while others appear to accept the situation as exempting them from serious work.

The Committee consider that if a child has gained a scholarship to a Secondary School the question whether he should be debarred for ophthalmic reasons from benefiting by it is one which requires very careful consideration and should not be decided by any arbitrary rule. The responsibility of refusing secondary education to a child capable of profiting by it is a heavy one. In the Committee's view there cannot be many cases where the ophthalmic surgeon would be justified in incurring that responsibility for ophthalmic reasons alone. The extent and nature of the risk to the child's eyesight involved by taking up the scholarship should be explained by the

ophthalmic surgeon to the parents and to the pupil himself, and on them should rest the decision whether it should be incurred.

E.—The Open Air School.

Some Authorities in this country have attached their classes for partially sighted children to Open Air Special Schools, a type of school which is primarily intended for the education of children suffering from malnutrition, anaemia, or other debilitating conditions which render them unfit to obtain full benefit from education at a Public Elementary School. In Liverpool, for example, the Underlea Open Air School for Delicate Children has one class of partially sighted children, who, though taught by "sight saving" methods, follow the ordinary régime of the open air school. Similar arrangements are made at Newcastle-upon-Tyne, where two classes of partially sighted children are assembled at the Pendower Open Air School. Dr. Livsey, Ophthalmologist to the Liverpool Local Education Authority, stated in his evidence before the Committee that in his opinion the special class in the open air school was the ideal arrangement for the education of the partially sighted, and that the regular midday meal and rest, which are conspicuous features of the open air school programme, were great benefits to the general health of the children and thus assisted in preventing deterioration of sight. At Bradford the Local Education Authority were so strongly convinced of the necessity of building up the general health of children who suffer from defects of vision that they built their special school for the partially sighted on open air lines; here also the midday meal is regarded as one of the greatest benefits that the school provides.

Several of our witnesses have emphasised the close connexion between the general health and nutrition of the child and the progress of certain ocular diseases and defects. It is necessary, therefore, to consider closely how far and in what manner the provision made in open air special schools for improving the general health of children can also contribute to the saving of their sight. We need not describe in detail the characteristics of the open air special school since that has been done from time to time in the Reports of the Chief Medical Officer of the Board of Education on the Health of the School Child. Apart from the open air construction of its classrooms—a type of construction that is by no means confined to special schools—its chief feature is an administrative block containing a kitchen, dining-room, rest-room, bathrooms, medical inspection rooms and staff rooms. This block provides the amenities on which the health work of the school depends. From the educational point of view the open air special school enjoys the advantages of small classes and an unusually flexible curriculum which can be readily adapted to the needs of individual children; but it is subject to a limitation that must be kept in mind in considering its capacity to deal adequately with partially sighted children, viz., that its curriculum is designed to meet the needs of children for a limited period of light work, during which temporary

physical disabilities can be overcome by special care and close medical supervision. When this period of recuperation is over the child leaves the open air special school and resumes its normal education, which the special school is not intended to provide. This important consideration determines the line by which we approach the problem of using the open air special school for the benefit of the partially sighted.

The two chief eye defects which display phases during which special care for the general health of the child is necessary are myopia and phlyctenular disease. Many myopic children are of the type that tend to "outgrow their strength," and we know that periods of rapid progress of myopia are sometimes associated with debilitating illnesses or prolonged convalescence. Improvement of general health is one of the factors, therefore, that may help to arrest the progress of myopia. The late Mr. J. Herbert Fisher, in his evidence before the Committee, referring to cases of dangerously progressive myopia met with in private practice, stated that a valuable method of treatment consisted in restricting the use of the eyes for all near work, and in residence in the country while all possible measures were taken to improve the physical condition. He was of opinion that such methods if sufficiently prolonged, say for two years, would enable most of these myopic children to resume ordinary education, and that generally speaking this course would be a wiser method of dealing with them than to relegate them to partially sighted schools for the rest of their school life. He said further that the progress of myopia was often as effectively prevented by improving the general health as by the restrictive "sight saving" methods of education.

The success of the treatment of certain eye diseases, particularly phlyctenular disease, depends as much, possibly more, on improving general health as on attention to the local conditions. During the acute or sub-acute stages of phlyctenular disease children should be excluded from school; in the quiescent stage children are sometimes admitted to special schools for the partially sighted where, although the eye condition receives adequate supervision and the methods of instruction are suited to meet the children's disability, the general health is not so likely to be improved as it would be in an open air school.

The Committee are agreed that during these phases of advancing ocular defect Authorities should make full use of the facilities that the open air special school provides, and they would mention in particular the advisability of transferring temporarily to the open air school children who are under the ophthalmologist's special observation because of the danger of rapid increase of myopia. It follows that the open air special school should be equipped, when necessary, with materials for employing "sight saving" methods and that the teachers should be instructed in their use. It is also necessary to add that precautions against glare from the sun must be taken by the provision of tinted glasses or eye-shades.

The broader question raised in Dr. Livsey's evidence, whether the open air special school can, or should in any circumstances be, adapted to provide a complete course of instruction for the partially sighted is one that the Committee feel bound to approach with a great deal of reserve. Notwithstanding the manifest advantages that attend the open air régime and the special medical treatment, to approve the segregation of the partially sighted in schools for physically subnormal children would not only cut across one of the main educational principles that the Committee advocate, but it would place in the path of full educational provision for the partially sighted the further obstacle that the nature and *tempo* of the work in open air special schools are not sufficiently stimulating for children who, apart from their eye defects, may be physically robust. It would moreover change the normal functions of the open air special school, which is concerned with the passing needs of individuals rather than with the continuous needs of a selected group. Accordingly, although considerations based upon local circumstances and temporary convenience may on occasion justify the use of the open air special school for the dual purpose of dealing with delicate and partially sighted children, the Committee's judgment is that in general the open air special school should fulfil for the partially sighted as for the fully sighted the duty of caring for them only during those periods in which educational considerations must be relegated to a position secondary to those affecting general health. It may, and often will be, that on these grounds the stay of certain partially sighted children in the open air special school will be prolonged beyond the limits usually needed for delicate children, but the principle that the length of stay shall be based upon a judgment as to the priority of educational or medical needs should apply to both.

It will be clear from the foregoing discussion that when a class for partially sighted children can be made an integral part of an ordinary elementary school conducted on open air lines, which can provide for such as need it a midday meal and a rest period, the Committee's views as to the best conditions for educating the partially sighted will be fully met.

F.—The Special Hospital School.

In a complete survey of the special provision for partially sighted children the Special Hospital School must be considered, though as an educational unit it is less important than as an agent in the treatment of certain acute and sub-acute diseases of the eye, and in the prevention of permanently damaged vision arising from those diseases.

There are a certain number of diseases of the eye which require skilful and prolonged medical treatment which, to be effective, can only be given under hospital conditions. A brief survey of these diseases may be given.

(i) *Conjunctivitis and blepharitis* are common forms of external eye disease in school children which respond fairly readily to treatment. Occasionally they are more severe, intractable, and of long

duration. Danger to eyesight may occur in cases of severe conjunctivitis when the inflammation causes corneal ulceration resulting in opacities. There is less danger to eyesight in blepharitis, but the disease is often intractable and disfiguring, causes discomfort and predisposes to corneal ulceration.

(ii) *Trachoma* is a disease which in the past has been responsible for many cases of partial loss of vision in this country. It is still endemic in certain parts of the world. Fortunately in this country, owing to the vigilance of port sanitary authorities, it has become comparatively rare, but a few cases still occur in the larger seaports. This is a disease which needs prolonged institutional treatment, both on account of its contagious nature and the long periods during which treatment must be given to effect a cure.

(iii) *Phlyctenular keratitis* is a mild but persistent infection which is associated with sub-normal nutrition and health. Owing to its tendency to relapse it is responsible for a certain number of cases of seriously impaired vision, a few of which may possibly be certifiable as blind. Treatment under hospital conditions is desirable if the ocular manifestations are predominant. Attention to general health, however, is essential, and in cases in which the eye symptoms are not severe admission to a Convalescent Home or an Open Air School may effect a cure.

(iv) *Interstitial keratitis* is a disease usually affecting both eyes. The acute or sub-acute stage may last a year or more, and the resulting opacity of the corneae may persist for a much longer period. During the active inflammatory stage treatment under hospital conditions is desirable. The corneal opacities resulting from the inflammation may cause such visual disability as to necessitate the child being admitted to a special school for the partially sighted.

For these acute and sub-acute diseases a special institution is required, which is something between a hospital and a special school for partially sighted children, with the hospital side predominating. It must be residential, preferably situated in country surroundings, and its buildings should be of a nature to permit of the isolation of the infectious from the non-infectious cases or from those of low infection.

Though there are ophthalmic hospitals and clinics throughout the country which are doing much in combating the diseases we are considering, there is only one institution, namely, The White Oak Hospital for Ophthalmia, Swanley, Kent, maintained by the London County Council, which fulfils all the requirements of treatment and education. The hospital and school buildings were opened in 1903 and are situated on a site of about 49 acres on a wooded hill 17 miles from London. The buildings consist of a central administrative block and infirmary; five units each consisting of four cottages, one of which is occupied by the Sister and three by 24 children in each; and a school with a central hall, classrooms, craft rooms for boot repairing and woodwork, etc.

Until 1921 only children from London and the immediate neighbourhood suffering from contagious eye diseases were admitted. Later, owing to the success in preventing and treating infectious cases, particularly trachoma, and the consequent diminution in the number of such cases requiring beds, the hospital admitted non-contagious eye diseases, especially interstitial keratitis. The accommodation is for 360. At the present time (1933) this is occupied by approximately 60 trachoma cases, between 30 and 40 cases of interstitial keratitis and 170 other cases. Before admission all cases are seen by the ophthalmologist of the London County Council. An ophthalmic specialist visits the school once a week. Complete isolation of the infectious cases from the non-infectious can be effected in the cottage units in the school. Two divisions, namely the trachoma cases and the non-trachoma cases, are kept entirely apart. The block in which the trachoma cases live is surrounded by a double fence, and they have a separate playground and a separate part of the wood to play in. The nursing staff consists of the Matron and 8 sisters, 8 nurses and 37 "house mothers." The teaching staff consists of a Head Teacher and 9 assistant teachers, while various members of the domestic staff, such as the cook and the gardener, give instruction in their particular subjects. There are part-time instructors in carpentry and shoe mending. The curriculum includes the usual educational subjects, as well as subjects of handwork, such as drawing, painting, plasticine modelling, raffia work, knitting, etc. The length of the school session is two hours in the morning and two hours in the afternoon. Special subjects of handwork, such as cookery, gardening, carpentry and shoe mending are taken out of school hours. The educational curriculum described above does not apply to children with interstitial keratitis; their work is mainly occupational, and they attend school for only one session of 2 hours in the day. The average duration of stay in the school of children discharged during the period October, 1929, to March, 1930, was for non-trachoma cases 12 months, and for trachoma cases one year and 8 months; during the period April, 1930, to October, 1930, it was for non-trachoma cases 7 months and trachoma cases one year 9 months. The late Mr. Treacher Collins, in his evidence to the Committee, stated that an investigation made in 1927 of 50 children who had left the institution two or three years previously showed that 78 per cent. were cured and showed no signs of relapse.

The advantages of treating chronic infectious diseases of the eye in a residential institution such as Swanley are that treatment can be made more effective and the duration of the disease reduced: moreover education can be provided. The facilities at Swanley are, however, used by only a few Authorities outside London. In other areas children suffering from chronic infectious diseases of the eye are dealt with, usually as outpatients, at the local hospital. We therefore recommend that the Board of Education should consider whether it is desirable for an institution similar to that at Swanley to be established in the North of England.

CHAPTER V.

“ SEGREGATION ” VERSUS “ NON-SEGREGATION ”.

We must now consider the position of the Day Special School for the partially sighted, and what relationship or association, if any, that school should have with the ordinary school. The general plan favoured in this country is that the special school for any type of exceptional child should be a self-contained unit under its own head teacher, occupying separate premises, using separate playgrounds, and having no connection or association with the ordinary elementary school. This is the arrangement usually adopted for the partially sighted. There are 37 special schools for the partially sighted in England and Wales, nearly all of which are conducted on these lines. The total accommodation of these schools is 2,030. This system, which may be described as one of “ segregation ”, has been the result partly of tradition, partly of administration. The first special schools in this country for the blind, deaf, mentally defective and physically defective were organised as separate units because it was thought that the children educated there had too advanced and disabling a defect to enable them to benefit by being educated with ordinary children. The tradition thus established has been encouraged in its continuance by administrative procedure. Special schools are administered under different Grant Regulations from those governing ordinary schools and a condition of grant is that they must be “ certified ” as special schools. This procedure in itself tends to keep them in a class distinct and separate from the elementary school system of the country.

Though there is still a barrier between “ special ” schools and ordinary schools, there has been in recent years a tendency to deal with certain types of exceptional children within the ordinary Public Elementary School system. We have classes for “ dull and backward ” children which, though forming part of the ordinary Public Elementary School, often admit a certain number of higher grade mentally defective children who would be eligible for a special school. Many of our Public Elementary Schools have special open air classes for delicate children, who in other areas would be sent to a certified special open air school. America and Canada have advanced further along the lines of educating exceptional children and ordinary children together. In these countries classes of all types of exceptional children are to be found in one public (elementary) school, working through the same grades as the ordinary children and joining the latter for those subjects which can be taught in common. This system, which may be described as one of “ non-segregation,” is applied particularly to the partially sighted. Mr. Robert B. Irwin, Director of the American Foundation for the Blind, in his evidence before the Committee stated that with the

exception of Seattle and one or two New England States the " non-segregation " plan had now become firmly established in all areas where " sight saving " provision had been made.

A brief description may be given of the arrangements for the education of the partially sighted in Cleveland, Ohio, U.S.A. Some members of the Committee had the advantage of seeing these arrangements in 1931. We are indebted for much of our information to the report of the Superintendent of Schools, 1929-1930. The population of Cleveland is approximately 900,000 and the enrolment in the public schools approximately 147,000. There are 15 " sight saving " classes in the public schools. The aim of these classes, as stated in the report, is " to provide for pupils whose eyesight would be seriously impaired if school work were done under ordinary class conditions an education equivalent to that of any child of like mentality, and also to provide an education for pupils whose impaired sight prevents their learning through ordinary teaching methods." The size of the special classes varies from 8 to 16 pupils, the average enrolment in 1930 being 13 pupils per teacher, as compared with about 22 pupils in English classes. The special classes are located in schools readily accessible from the children's homes. Special equipment, such as desks, blackboards, typewriters, large maps, etc., is provided, and special attention is paid to good lighting. Each child participates in the regular class room work of his respective grade and attends all classes which do not require reading or written work. The aim is to follow the curriculum of the general school as far as possible, but certain substitutions are deemed necessary for such subjects as art work, sewing, bookkeeping and printing. " Eye hygiene " occupies an important place in the curriculum.

A system similar to that of Cleveland is in operation in a few areas in this country, notably in Liverpool. Liverpool has a population of 865,000 and the number of children on the elementary school registers is 142,428. The number of children ascertained to be partially sighted is 163, of whom 112 are in special classes and 39 in ordinary schools. The partially sighted children are educated in six special classes, of which two are assembled in one Public Elementary School, two in another Public Elementary School, one in a third Public Elementary School and one in a special open air school for delicate children. A description of the arrangements at Birchfield Road School, which contains two special classes, was given by Mr. F. W. Smith, the Headmaster, in his evidence before the Committee. Birchfield Road is a mixed school of 1,200 children of ages five to fourteen. There are two classes of partially sighted children containing a total of 33 children of both sexes and of ages seven to over fifteen, under two teachers. The scholars come from about 24 different Elementary Schools at distances up to two miles from Birchfield Road School. The two classes of partially sighted children are arranged to correspond with

Standards 2, 3, 4 (Lower class) and 5, 6, 7 (Upper class), the ages of the children in the lower class being approximately 7 to 11, and in the upper class 12 to 16. The partially sighted children spend about one third of their time in the ordinary school for oral work in Geography, History and Scripture and they go to the classes which most nearly correspond to the age and the attainments of the individual children. The scope of the curriculum is the same as that of the ordinary school, except that less time is given to Arithmetic and more time to English. In the course of his evidence Mr. Smith stated that one of his chief aims was to bring the partially sighted children as fully as possible into contact with the life of the ordinary school and so give them a social education which was impossible in the "segregated" school. They assembled for prayers with the school; had "break" at the same time; received their prizes at the school speech day; entered for the school swimming gala and became members of the school sports team when able; and wore the school badge. They were in fact absorbed into the ordinary school and were not regarded as members of a special school. Such measures in his opinion were likely to obviate a feeling of inferiority on the part of the child.

It is necessary to weigh very carefully the relative merits of the two systems, that of "segregation" and "non-segregation," as put before the Committee by witnesses. The non-segregation system was formerly the practice in London, and the views of Mr. Dobson, Head Teacher of the London County Council Special School at Barnsbury Park, and of Mr. Edward Evans, Superintendent of the East Anglian School for the Blind and Deaf, both of whom have had experience under it, are of particular importance and value. Mr. Dobson was opposed to the establishment of the special class in the ordinary school on the ground that such a class would have to take children of all ages and of varying attainments. He agreed that the position of the teacher of the special school was made easier to some extent under a system that allowed scholars to go into various classes in the ordinary school for oral subjects, but he felt that under such an arrangement the teacher, often against his will, became solely an instructor in subjects necessitating written work. Much depended on a proper understanding between teacher and pupils for the satisfactory teaching of humanistic subjects. He agreed that the special school should be large enough to permit of classification according to age and attainments. The larger the school the better for educational purposes, and in his view the optimum number was between 60 and 100. The education of partially sighted and ordinary children together involved considerable administrative difficulties. It was practically impossible for instruction in any one subject to be given at the same time and on the same day in the ordinary boys' and girls' departments. The mere fact of a physical exercises lesson of 20 minutes'

duration being introduced into the time-table of either department was sufficient to upset the whole time-table of the special school. Activities such as physical exercises, competition practice for choral work, examinations, educational visits and many other interruptions which necessitate temporary changes in the time-table of the Elementary School were not conducive to the smooth running of the dependent partially sighted department. The Head Teacher of the ordinary school naturally organised his classes and the size of these classes to meet his own requirements without particular reference to the needs of the partially sighted. The witness mentioned one occasion in which the boys in his class went to one standard in the Boys' Department and the girls, 12 in number, were split in four sections. Under this arrangement in Geography alone his class had five separate syllabuses and it was practically impossible for him to examine their work in this subject at all. Finally, the teachers of the ordinary school had not a special knowledge of the defects from which the child was suffering or of the child's home conditions and family history in the same way that the special school teacher had.

Mr. Edward Evans was equally emphatic in opposing the special class in the ordinary school. He stressed the administrative difficulties involved by the children going to part-time oral instruction in the ordinary classes. A suitable time-table was difficult to arrange and the ordinary class teachers were generally impatient of the interruptions caused by the introduction of these special school children. The witness suggested, too, that partially sighted children suffered from a feeling of inferiority by reason of their close association with fully sighted children. They tended to herd together in the playground and not to mix with their sighted companions. It proved difficult for them to be absorbed into the corporate life of the school. Although he admitted that there were some cultural benefits to be gained, it was his firm opinion that any advantages there might be in this system were greatly outweighed by its disadvantages.

The late Dr. Eichholz, who had the advantage of seeing both systems at work over a period of many years, said in evidence before the Committee that the segregation of the partially sighted child in a special class was to a certain extent detrimental to his educational, psychological and cultural interests. Certain difficulties, however, were inherent in the arrangements for educating partially sighted and ordinary children together. These included the interruption in lessons occasioned by the special children having to go to various class rooms, the lack of co-operation between the special class teachers and the ordinary teachers, the difficulties that partially sighted children have in seeing blackboard work in the ordinary class room, the possible dangers of taking physical training with normal children and the absence of arrangements for vocational training or placing children in employment.

The bulk of the evidence indicates, therefore, a preponderating opinion in this country in favour of the "segregation" system of educating partially sighted children. On the other hand the "non-segregation" system has proved practicable in one English city—Liverpool, and is the prevailing system in the United States and Canada. Our witnesses from Liverpool advocated "non-segregation" no less strongly than our American and Canadian witnesses. Captain Baker, of the Canadian National Institute for the Blind, stated that he was definitely opposed to the total segregation of partially sighted children in separate classes and that it was very desirable that they should be associated as closely as possible with normal children. Mr. Robert B. Irwin, of the American Foundation for the Blind, described "segregation" as a "lazy way of organizing" which exaggerated the children's handicap and rendered them "psychologically blind" by encouraging them to think they were blind. They were never allowed to forget their disability. Dr. Livsey, Ophthalmic Surgeon to the Liverpool Education Authority, endorsed these opinions and emphasized the fact that the "non-segregation" system enabled children to take part in the corporate life of the school and to make the best of their powers. The system was more popular with parents as the child was not "stigmatized" by being sent to a special school.

The Committee have consulted various American educationists, who have had experience in the organization of partially sighted classes in the public schools, on the difficulties of educational administration and organization entailed by the "non-segregation" system, which appear to form the basis of opposition to the system in this country. Miss Helen J. Coffin, Supervisor of the "sight-saving" classes at Cleveland, Ohio, who was consulted concerning the difficulty of having all ages and grades in one special class, writes: "The fact that the 'sight-saving' teacher has a number of different grades makes it possible for her to instruct the children in their own grade work while other grades are reciting in the regular classes. We find that some 'sight-saving' teachers who have four or five grades never have the room empty but seldom have all the 'sight-saving' pupils at one time. This tends to keep them graded." She is of the opinion that the absorption of the partially sighted children into the ordinary public schools prevents the formation of the "inferiority complex." She emphasizes the importance of co-operation between the teachers of the ordinary classes and the teacher of the special class, a matter which depends so much on the personalities of the people involved. To secure this smooth running between the "sight-saving" classes and the ordinary classes, one of the essentials, according to Mr. Robert B. Irwin, is the education of the Head Teacher and the class teachers in the methods and value of "sight-saving" and the enlistment and maintenance of their interest in the work. With

this end in view he is of the opinion that in large centres of population a "sight-saving" class supervisor, whose duties should include the co-ordination of the arrangements and a tactful smoothing out of any difficulties that might arise, should be appointed.

The psychological advantages of the system of "non-segregation" were emphasized by Miss Edith W. Taylor, Educational Psychologist, of Cleveland, Ohio, with whom the Committee have been in correspondence. Miss Taylor writes: "Having lived in schools devoted entirely to the education of blind and partially sighted and later having worked with the day classes where they were trained co-educationally with the sighted, I have reached a very definite state of mind regarding the two methods and I feel most strongly that the latter method is the only just and natural way of training these children to the environment which they will of necessity share and to which they must adapt themselves in later life."

It is impossible for the Committee after hearing the evidence to doubt the conviction and sincerity with which these conflicting opinions as to the practical and psychological value of the two systems are held. To judge between them is no light task, but the Committee would not be fulfilling its purpose if it failed to make definite recommendations for the future guidance of Authorities seeking to deal with the problem of their partially sighted children in the best way. In order to arrive at a decision it has been necessary, first, to examine the basis of actual experience which has given rise to the opinions that prevail at the moment in this country, and secondly, to consider existing practices and opinions in the light of the movements that are taking place in the general educational policy of the country.

There can be no doubt that the dominating factor in forming current opinion on the education of the partially sighted has been the pioneer work of the London County Council, to whom belongs the credit of having realised the gravity of the problem and of making a systematic attack upon it. In school organisation and teaching method the London County Council special schools for the partially sighted have supplied the model which most of the Authorities that provide similar schools have copied. By reason of its large and concentrated population London was in a peculiarly favourable position for isolating the partially sighted children and studying their special needs. The aggregate number of children involved was large enough to enable the Authority to create a system of special schools that would attract able teachers who were specially interested in the work, to maintain an adequate training ground for new entrants to the service, and to provide avenues of promotion for those who showed conspicuous ability. The London County Council have created schools of various sizes from one to six classes, and their experience shows that those schools have been most successful in which the concentration of numbers

has been exceptional even for London itself. Such concentration would be even more uncommon under smaller Authorities. Without detracting in any way from the signal services that London has rendered it may yet be questioned whether its example should be followed by Authorities in whose areas the material conditions differ widely from those that have made the London experiments practicable and fruitful. The general considerations that we shall now put forward lead us to think that for most Authorities the balance of advantage lies on the side of "non-segregation."

One of the chief features of the general educational policy of to-day is the remodelling of the school system for the purpose of obtaining within the reorganised schools the greater elasticity of organisation and method that is needed to cope with widely varying individual differences. Clearly there are some deviations from the normal, e.g. blindness or deafness, so great that children suffering from them cannot take their place in the ordinary schools as at present organised in this country. Such children are, therefore, certified and dealt with in special schools outside the ordinary school system. This ensures that they will receive an education specially suited to their peculiar needs; it also enables the Authority to enforce their attendance at school beyond the normal age of leaving, and to provide during the extended period vocational training that is outside the scope of the ordinary school curriculum. The question which it is necessary to discuss now is whether the defect of the partially sighted is of such a character as to require that they too should be segregated from fully sighted children.

First, as to the need for an extension of education beyond the ordinary school leaving age. Under Section 61 of the Education Act the age for compulsory attendance at a special school for partially sighted children is up to 16. Most of the Authorities, however, who provide special schools for the partially sighted allow a child in attendance to leave at 14 if a suitable job has been found for him, rather than attempt to compel him to remain until 16 when the chances of obtaining employment may be less favourable. Moreover, it is very difficult to secure the conviction of a parent who has removed his child before the age of 16 and Authorities are naturally most reluctant to risk a failure to win their case in a Court of Law.

The fact that Authorities forgo in practice the peculiar advantages of special schools—extended education and vocational training—materially weakens the case for segregation, yet it might still be true that partially sighted children deviate so far from the normal that the ordinary school cannot provide a satisfactory education for them. In the face of the evidence, however, it is impossible for the Committee to conclude that the ordinary school cannot in any circumstances undertake and perform efficiently the task of educating partially sighted children.

But even if it is felt impossible to claim that partially sighted children can only be satisfactorily dealt with outside the ordinary schools, can the provision of separate special schools for them be justified on the ground that such schools give them educational advantages that are incontestably greater than those which the ordinary school can offer, even after due allowance has been made for the fact that a certain stigma attaches to children who have been separated from their fellows during a period of their education?

This is a difficult question to answer. The number of special classes in ordinary schools in England is too small to form a satisfactory basis of comparison, and the special schools vary so widely in efficiency that it would be hard to determine their norm.* The special school has undoubtedly the advantage that it is self-contained and that its staff of specialist teachers can address themselves with a single mind to the specific problems of the children without the distractions that continual reference to the convenience of other teachers and children must inevitably bring. But there are considerations which, in the opinion of the Committee, would make it difficult to assert that these schools are in fact giving an education better than it is possible to secure in special classes within an ordinary school. As a result of a definite medical policy the régime of many of the special schools for the partially sighted has been in some important directions rigid and restrictive, and has not conduced to the maximum development of the educational potentialities of all the children that have attended them. This matter is dealt with more fully in a later section, but it calls for mention here as showing that by denying to some of the children educational opportunities by which they might have profited the special schools have not hitherto entirely justified themselves by their works.

We have considered, too, the replies from the Head Teachers of special schools for the partially sighted to the question what specific advantages the special school confers on the children who attend them. Many of these replies showed every sign of the most careful consideration, but their substance consists almost exclusively in the claim that the children derive their greatest benefit from the individual attention and sympathetic treatment that they receive from their teachers. To that conclusion all who know the schools would subscribe, though it is necessary to point out that the possibility of conferring these advantages does not depend upon conditions that are inherent solely in the segregated special school.

It must further be remembered that the special schools for the partially sighted, which now exist as schools for children of all ages, belong to a type that is becoming obsolete because of the educational disadvantages that the wide age-range comprised in its classes entails. If the special school for the partially sighted is to maintain in public esteem an equality with other schools within the educational system it can do so only by conforming to the best type

* See Section 10 of Appendix F.

of organisation. This consideration tends to limit the field in which the segregated special school can thrive to areas in which there is a sufficiently large number of children to provide separate Senior and Junior Departments.

On these grounds, therefore, the Committee consider that the non-segregation system has a powerful claim and that where experiments in it have been tried and failed, the failure was due to an insufficiently resolute attempt to overcome the difficulties inherent in the system. That a special class can efficiently carry out the task of educating partially sighted children, provided that it can be incorporated in a school that already has a large number of classes, is proved by the experience of Liverpool and certain cities in America. But the success of such a class depends on many factors, the most important of which is a close and sympathetic co-operation between the teacher of the special class and those of the ordinary classes.

The essential condition for ensuring this co-operation is that the special class shall be an integral part of the school and under the supervision of a head teacher who has a full sense of his or her duties towards partially sighted children. Our American correspondents and witnesses attributed the success of the non-segregation system to the fact that special classes for the partially sighted are established, or allowed to remain, only in those schools which have a head teacher with the necessary qualities of administrative ability and personal interest in the welfare of the partially sighted. They inform us that in extreme cases classes have been removed from the ordinary school because of lack of interest on the part of the head teacher. The supreme importance of making the qualities of the head teacher the chief criterion in the choice of a school in which a special class is to be formed is emphasised by the experience of the non-segregation system as conducted in Liverpool. The Committee feel that neglect of these considerations has probably contributed largely to the breakdown of the system in areas where "non-segregation" has given place to "segregation."

Practical considerations lead the Committee to reinforce their recommendation that greater efforts should be made to provide within the ordinary school system the modified methods of education needed for the partially sighted school system. Appendix E on pages 160-161 shows the urban areas in England and Wales with an average number on the school registers of 10,000 and over which have no partially sighted or blind school maintained by the Local Education Authority. In some of these areas, e.g. Brighton and Preston, there are voluntary schools for the blind to which partially sighted children are admitted. In others, e.g. Willesden, Tottenham, Leyton and West Ham, the Authority send partially sighted children to a special school conducted by a neighbouring Authority. An examination of the table will reveal that the majority of partially sighted children are in the ordinary Public Elementary Schools. Those who are reported to be in special schools have, in

the majority of instances, been admitted to residential schools for the blind. It will be observed further that out of the 52 areas shown in the table, 37 have an average number on the school registers of under 20,000. Assuming the ascertainment in these areas to be complete, and taking the estimate of the number of partially sighted children as about 1 per 1,000 on the elementary school registers, the number of partially sighted children in each would vary between 10 and 20. In the majority of these areas therefore there is only a sufficient number of partially sighted children to form a one-class school. The one-class school has been described by one witness as an educational abomination. Many of its objections however can be overcome by establishing a special class in the ordinary school. Grading corresponding to that in the ordinary school can be secured for certain subjects, while owing to the fact that at any one time a number of the children are attending classes in the ordinary school for oral work, the residue, even though their age-range may be large, can be conveniently dealt with by individual or sectional methods. And finally the partially sighted children, being members of the ordinary school community, gain that training in social and corporate life which is so essential for their future careers.

The Committee realise that the establishment of special classes in the ordinary schools solves the problem how best to deal with partially sighted children in only a limited number of areas. Such a scheme is not practicable in areas with a school population of under 10,000, or in county areas which have a large proportion of their population living under rural conditions. For the isolated area which is not large enough to provide a sufficient number of children to form a special class the only course is to send the partially sighted children to a residential school, or to board them out in a neighbouring town or city in which educational provision for such children is made. (See Chapter IV, Section B.) There are however in certain parts of the country, e.g. between Birmingham and Wolverhampton, in Lancashire and Tyneside, thickly populated districts which are made up of contiguous Education Authorities having school populations of between 4,000 and 10,000. It should be possible by co-operative planning on the part of such Authorities to establish special classes in Public Elementary Schools which are accessible to partially sighted children in adjacent areas. The same principle is applied already by the establishment of segregated special schools to serve two or more Local Education Authorities. For example, the special school for partially sighted children at Wood Green admits children not only from Wood Green but from the neighbouring areas of Tottenham and Hornsey. For such areas the Committee recommend a scattering of special classes for partially sighted children in certain Public Elementary Schools of adjacent areas rather than the centralisation of them in one special school. Such an arrangement has the advantages of rendering facilities for special education more accessible and of conforming to the principle of "non-segregation."

Educational advantages are for once compatible with economic considerations. It is obviously more economical to provide for the education of partially sighted children within the ordinary system than to send them to residential schools for the blind or partially blind, or even to establish a small special school as a separate entity. In larger areas the extra expense which is involved by the necessity of providing transport for the children could be obviated by having two or more classes in different elementary schools, chosen from the point of view of accessibility from various parts of the area.

Moreover, we have to consider the advantages of the non-segregation system in relation to the general provision for partially sighted children in the country. In Chapter I we estimated that the number of partially sighted children in England and Wales was approximately 6,000, of whom approximately 3,000 were not receiving any special form of education. The number of partially sighted children in the areas named in Appendix E, estimated on the basis of 1 per 1,000 on elementary school registers, is approximately 1,000, a figure which is considerably increased if we take into account those in adjacent urban areas. Hence more general provision on the lines we indicate would solve the problem for these children, most of whom at present are either sent to residential schools for the blind, a course with which the Committee is not in agreement*, or are educated, as far as the limitations imposed by their defective sight can allow, in the ordinary schools.

It may be argued that however desirable in principle the non-segregated system may be, it may be found impracticable in some areas where the Hadow system of reorganisation has been effected. The Committee have given careful consideration to this difficulty. If the Hadow Scheme is in operation the Public Elementary Schools are divided into Junior Schools, taking children up to the age of 11 and Senior Schools taking children of the age of 11 plus. The position may be further complicated by the division of the Senior Schools into Boys' Schools and Girls' Schools. In areas or groups of areas which are large enough to have a sufficient number of partially sighted children to form special classes in each type of school, the policy advocated can be carried out in its entirety. In smaller areas in which the number of partially sighted children is not sufficient to form a class of children that will fit in with the type of organisation prevailing in the area the problem is much more difficult. For instance, in a reorganised area there may be only enough partially sighted children to form a special class by combining the seniors with the juniors, a step which the Authority might hesitate to take. Or there may perhaps be in an area too few partially sighted children of all ages to justify the formation of a separate class in any type of school. In such cases it appears to the Committee to be the better policy to bring the children together

* See Chapter IV, Section B.

into the school or schools best suited to their age and sex, and to endeavour to provide within the existing framework of the school that receives them differential treatment for the partially sighted children along with exceptional children of the other types. In every school there are to be found exceptional children who require special instruction because of slight mental or physical disabilities. Such children should not be wholly cut off from the main stream of school life, and yet if they are to make reasonable progress they must be detached at intervals from the classes which they usually attend in order to obtain help in overcoming their special difficulties. A special class to which exceptional children may go, as they go to a medical clinic, for treatment of educational ailments could be made to serve the needs of partially sighted children, as well as of other children suffering from general or special forms of retardation. There they could do, under the supervision of a teacher who understood their needs, such work as was incompatible with the routine of the classes to which they normally belonged. As yet, however, such classes as these are rare, but concern for the welfare of exceptional children is increasing and special knowledge of their needs and treatment is growing rapidly with the spread of Child Guidance Clinics. There can therefore be little doubt that specially trained teachers and special classes will grow in numbers, and among the problems with which they should attempt to deal will be those arising from defective eyesight.

Finally, the importance of educating partially sighted children in order to fit them to live their life among the sighted is a strong argument for the closest possible association with fully sighted children throughout their school life.

After balancing the advantages of the segregation and non-segregation systems, and recognising fully the difficulties which much be overcome and the prejudices which must be broken down, the Committee recommend that the education of partially sighted children should be conducted where possible in special classes attached to, and forming an integral part of, the ordinary school.

CHAPTER VI.

EDUCATIONAL PROBLEMS.

A.—Introductory.

Teachers in schools for the partially sighted have to face not only the educational problems common to the lot of all teachers, and these often in a particularly acute form, but also a number of varied and difficult special problems. Their task calls for courage and understanding as well as human sympathy. In the teacher witnesses and in much of the written evidence submitted in answer to the questionnaire sent to all schools for the partially sighted the signs that many teachers possess these qualities are easy to discern; and the Committee wish to record here their great indebtedness to all the teachers who have co-operated with them for the thoughtfulness, sincerity and cordiality that they have shown, and to pay tribute to the devotion that the teachers have so manifestly displayed in the pioneer work of evolving a new type of education.

(1) *Inconsistencies in Educational Practice and Ophthalmological Doctrine.*

When we come, however, to sift the mass of evidence that has been presented, we find both in matters of major principles and in points of minor detail a bewildering variety of opinion and practice. For example, whereas in a majority of the schools the children, whatever the nature or degree of their visual defect, are not allowed to read anything but hand-printed matter of which the height of the letters is about one inch, in some schools the children are allowed to read freely from books printed in large type; a few schools encourage vigorous games, apparently with good effect, while most schools under the ophthalmologist's advice, deliberately avoid them; many schools forbid the use of ordinary pencils for writing, others use them regularly; one school has a continuous record of successes in gardening competitions, another in a neighbouring town does not permit gardening because of the risks that stooping and digging are alleged to entail; some schools find it possible to engage in almost all the common forms of hand-work, except needle-work, that are found in public elementary schools, while others rigorously limit the handwork to those forms which demand no fine movements or measurements; some authorities condemn, others approve, the use of the epidiascope.

The origin of these inconsistencies lies in a conflict of ophthalmological opinion, but of all the varied influences on the part of ophthalmologists that have been brought to bear on the schools, there can be no doubt that those which have hitherto held the strongest sway have been concerned rather to proscribe certain forms of activity known or suspected to be dangerous than to explore the children's educational potentialities, having regard to their specific defects. The authors of this "safety first" policy can no doubt

cite instances in support of their views, but the schools supply abundant evidence that generalisations based on such instances have been in practice applied to cases of defect to which the instances have no relevance. Examples of this will be given in later sections of this chapter; it suffices here to say that the effect of indiscriminating prohibitions has been to paralyse certain kinds of legitimate educational enterprise. On the other hand those who have been responsible for bold departures from the more conservative practices have not as yet substantiated their case by adducing the results of carefully controlled observations and experiments. The situation may be briefly summed up by saying that, so far as educational practice related to visual defect is concerned, school methods are still in the pre-scientific stage.

To say this is not necessarily to imply a rebuke; such a phase is probably to be expected in the course of every new venture in education. What is important for our present purpose is to review the effects that current ophthalmological doctrine has had upon the schools, to unravel as far as possible from the tangle of conflicting opinion the strands of sound principle, and to indicate the lines along which further experiment is both safe and likely to be profitable.

(2) Some broad Characteristics of the Education of the Partially Sighted.

On comparing the schools for the partially sighted with the Public Elementary Schools it is easy to discern three broad characteristics in which there are fundamental differences. The first is in respect of the use of reading materials and the correlative writing materials, upon which severe limitations are imposed in the schools for the partially sighted. The second is that hand-work has a far more prominent place in the curriculum of the school for the partially sighted; it is described by one of our witnesses as being of supreme importance, and as standing in relation to the partially sighted school as Latin does to the Public School. The third is the devitalised condition of Physical Training in most of the schools for the partially sighted, as the result of the ban placed upon certain kinds of vigorous movements. There can, of course, be no doubt that these marks of differentiation arise from considerations that are entirely pertinent to certain visual defects; but it is also certain that doctrines based upon these considerations have been applied without full regard to their practical implications. The ban on printed books, for example, has imposed a crippling burden on the teachers, who have to devote their own or their pupils' time to producing hand-printed matter which at best provides only the scantiest of literary fare; the craftwork has admittedly become in some instances not an educational medium of prime importance but merely a time-killing occupation; and

the deprivation of a full measure of brisk bodily activity has served to accentuate the postural defects to which partially sighted children are naturally prone.

(3) *Visual Defect and Educational Bias.*

We shall discuss in turn each of these three matters at a later stage, but it is first necessary to examine in a broad fashion some of the consequences of defective vision as they bear upon children in a modern community in order to find, if possible, a criterion by which the aims of the education of partially sighted children can be judged. Since the greater part of the population of this country is urban it follows that the majority of the partially sighted children are town-dwellers and are therefore debarred by circumstances from taking up a country life and the open-air pursuits to which the imagination is so prone to turn as a panacea for human disabilities. Most of our partially sighted children therefore will subsequently have to find what footing they can in the world of trade or industry, and their limitations will operate not only on their school activities but also upon their after-school career. It would be folly to ignore the influence of this consideration upon their early training. The partially sighted child is precluded from entering any occupation that calls for close or continuous use of the eyes, and certain myopes in particular are unfit for any occupation that demands sudden or severe muscular strain. During times like the present when competition for the jobs available in industry is exceedingly keen owing to the spread of mechanization the penalties attaching to any physical defect that tends to lower a worker's efficiency or to increase his liability to accident are becoming more and more severe. Partially sighted persons are therefore cut off from a chance of employment in an increasingly large proportion of manufacturing processes, as well as from the clerical side of industry. Speaking very broadly and admitting important exceptions we may say that they are likely to find their best chance of employment in the distributive trades, which call less for skill with one's hands than for an understanding of one's fellow men. It is true that some may find suitable employment in manual occupations that demand deftness of hand without close ocular attention, as for example some processes of packing, the assembly of woodwork prepared by machinery, or french polishing; but it is probably a safe generalisation that the cultivation of manual dexterity is less important for the partially sighted as a preparation for earning a living than it is for those who possess normal sight. There is, however, more to be said for cultivating it as a means of employing leisure time which fully sighted people may spend in reading. If this generalisation holds it seems to point in a direction opposite to that which ophthalmologists have been trying to follow in the hope of saving sight, for it would set a premium on the humanistic as

opposed to manual or technical bias in education. It would indicate as the proper objective of the education of the partially sighted the cultivation of those qualities that will enable them to meet their fellows on an equal footing in the ordinary round of business and social life, in which good address, confident carriage, and an intelligent grasp of topics of permanent and passing interest avail far more than a clever pair of hands, valuable as such hands may be to anyone in his private capacity. If therefore the curriculum must be modified for those whose sight is defective, the changes should emphasise first those aptitudes that the partially sighted have in common with the rest of their fellows and in which to excel will bring some compensatory advantage for their natural handicap, and secondly those parts of a sound general education that are most likely to lead to success within the limited spheres of employment to which the partially sighted will have access.

That the teachers have been conscious of the importance of some of these general considerations is shown by the frequent reference made in answers to the questionnaire to the increased self-confidence, the improved speech and conversational powers and the greater sociability that children show after a stay in the school for the partially sighted. The recommendation made in Chapter V that the special class for the partially sighted should be an integral part of a larger school community shows the importance we attach to enabling the partially sighted to associate freely not only among themselves as a separate class but among all classes with whom they will have to mix in later life. The cultivation of mutual understanding and tolerance between people who have different gifts and limitations is an essential part of the educational process; it cannot be imparted by a teacher to a class of children seated in rows before him. It can only come from natural intercourse in a society in which every member has duties and responsibilities and a proper share in co-operative enterprises. The régime of any school or class for the partially sighted should therefore embrace as wide as possible a range of social intercourse and of activities in which leadership and team-work have full opportunities of development, for only on a sound basis of co-operative behaviour in school can be founded the qualities of character that will serve the children best in later life.

(4) *The Problem of Reading: Myopes and Non-myopes.*

Having thus emphasised the importance we attach to the humane and social aspects of the education of the partially sighted we return to the consideration of the three main characteristics of the education of partially sighted children mentioned above. The problems that arise out of the question of reading are of the greatest moment; reading is one of the chief keys to the world

of ideas, and children who are deprived of its use are gravely handicapped in modern society. As stated in Chapter II, partially sighted children fall into two classes, viz., those who cannot see well enough to use the ordinary school books and materials and those who can, but whose sight might deteriorate if they were allowed to use it to the extent necessitated by following the ordinary curriculum. The former class is predominantly non-myopic, the latter predominantly myopic. Hitherto both classes have in the main been treated by the same method, which is characterised by the prevailing practice of prohibiting reading except from very large hand-printed type. There are, however, in the schools many children to whom reading presents no dangers although they may have difficulty in reading any but the largest print, and there are even children, e.g., hypermetropes and children with scarred corneae, who should be encouraged to read. The reasons adduced for not allowing such children to do work that is considered unsuitable for myopic children are, first, that it is difficult for the teacher to cater for readers and non-readers in the same class, and secondly, that to permit non-myopes to read books that are denied to the myopes in the same school or class would stimulate in the myopes feelings of envy and inferiority and would provide them with an incentive to read which would be injurious to them. Certain educational opportunities have on this account been denied to non-myopes in the alleged interest of the myopes. The situation that has arisen is one that we cannot defend, for to do so would be to give consent to adding to the initial handicap of the non-myopic partially sighted children the further handicap of an inferior or incomplete education. To admit that it is impossible in any circumstances to overcome the difficulty of teaching readers and non-readers in the same class would be a confession of failure which we cannot reconcile with our general experience of the resourcefulness of teachers; but to assume that there must inevitably be such a dichotomy of the pupils begs the crucial question whether the myopes themselves should or should not be allowed to read printed matter of any kind. On this is a very sharp cleavage of opinion.

One very influential school of thought holds that because of the inevitable danger to the eyesight of myopic children which the constant use of books entails—a danger none the less real because the full effects may not accrue until middle age or later—it is the duty of those who are responsible for the education of myopes to discourage by all means in their power the habit and the love of reading. This position they maintain although it means cutting off the children from one of the chief sources of knowledge and also in a large measure from the literary heritage of the race, and despite the fact that it may deny them entrance to professions or occupations in which their intelligence, temperaments and interests might enable them to succeed notwithstanding their defective sight. Many men have attained distinguished positions in life in spite of

the handicap of severe myopia who would probably have been condemned to mediocrity if in early life they had been forbidden the use of books.

Another school of thought, well represented among our expert medical witnesses, would allow the use of books under carefully guarded conditions, holding the view that the risk of impaired vision is not as a rule great enough to justify the loss of educational opportunities caused by deprivation of books.

The protagonists of these conflicting views are irreconcilable, and the issue between them can only be settled by a complete demonstration that eventual breakdown of eyesight in myopia is frequently traceable to the reading habit as a main or largely contributory cause. Wisdom after the event is no safe guide; those who have faced the risks and survived may rejoice that they were not deterred by the dangers; those who have faced them and succumbed may hold the opposite view. The risks are real, but experts are divided as to their magnitude and as to the best methods of meeting them. It seems impossible to escape from the dilemma of an inferior education on the one hand with the impaired life-prospects that it may involve, and on the other hand the risk of a greater or less deterioration of sight. The child whose life-interests are perhaps at stake is too young to decide wisely; the parent, whose claim to a voice in choosing his child's career cannot be questioned, may judge ignorantly; the Local Education Authority on its part is rightly conscious of a duty to see that no child suffers avoidable injury as a result of attending school. The ophthalmologist in his anxiety to save sight may sometimes be predisposed to judge the issue too narrowly; yet upon him devolves the duty of providing in the light of his own experience the information as to ocular potentialities and dangers which will guide the three parties more directly involved to a wise decision. His primary concern is with the child as an individual and the more closely his advice is related to the particular needs of individual children the more helpful it will be. The risks of eventual loss of sight vary greatly from one case to another, and the ophthalmologist assumes a grave responsibility who, despite this fact, advocates a rigid system of education that sacrifices the interests of the many for the safety of the few.

The reading of printed matter of a size large enough for them to read without taking up a harmful posture entails little or no danger to non-myopes, and we cannot agree that the great advantages which they would gain from reading should be sacrificed for the sake of avoiding a dangerous example to myopes. We hold that there should be as much differentiation of educational treatment between myopes and non-myopes as is compatible with the accepted fact that class organisation necessarily imposes some

restriction on the amount of individual attention that the teacher can give to a particular child or group of children.

With myopes it is clearly necessary to exercise a great deal more caution, but we think that the regulations hitherto in vogue have been more stringent than the circumstances of many of the children concerned have warranted. We still hold that the amount of time devoted to reading must be carefully regulated, and that children who have very advanced myopia, or are suffering from serious fundus changes, or are passing through a phase of rapid increase of myopia, may quite properly be subjected to all the restrictions now commonly in vogue, or even be forbidden for a time to read at all. But since the risk of eventual loss of reading sight is confined to a small minority, and that late in life, we contemplate without misgiving a considerable relaxation of the embargo on printed books that now holds in so many schools. The chief danger incurred in reading arises from excessive convergence of the eyes, combined with stooping; and after a careful review of our ophthalmological evidence we have no hesitation in recommending that children with only a moderate degree of myopia, uncomplicated by serious fundus changes, should be permitted to read any printed matter that is easily legible to them at a distance of about 14 inches, provided that they do not stoop in the process and that the reading is not continued so long as to cause ocular discomfort and fatigue. The ordinary reading period, which varies from 15 to 20 minutes for infants to half an hour or thereabouts for older children, and is commonly broken up by spells of discussion of the reading matter, is not usually likely to prove excessive, but no limits that can be universally applied can be laid down.

Our advocacy of an extension of the use of reading rests upon a belief that a substantial improvement of educational standards would follow. The extent to which partially sighted children suffer from the deprivation of books is indicated by the conclusions drawn by Mr. Lumsden in Appendix F, in which he says that "in English subjects the special school children are inferior to fully sighted children of the same level of intelligence, ten-year-old fully-sighted children making a better score than thirteen-year-old special school children," and further, that the special school children are most of all backward in geography and history. Proficiency in these subjects undoubtedly depends in a large measure on the use of books. If, however, our hopes of improvement are to be fulfilled, it is clearly necessary that a far larger supply of suitably printed books should be provided than is available at present, and this raises various technical and commercial problems which we discuss in the next section. The very limited experience in English schools of using junior text-books printed in bold characters or books published by the American Clear Type Publishing Co. has as yet produced no conclusive evidence of educational advantage, though

Mr. Lumsden says that in English subjects there is a fair presumption that the use of books has aided the children who have been permitted to use them. But even though their experience has been limited, the teachers who have used the American Clear Type books have been favourably impressed by the general effects of using them, and many have expressed the wish that similar printed books, in a greater scope and variety of subjects and more closely adapted to use in English schools, could be made available.

The problems of providing suitable reading matter go beyond the schools themselves. If the children are to be fully protected from dangers it will be necessary to provide parents with sound advice as to out-of-school reading, and it would be well to enlist the co-operation of the Public Libraries, as has been done in at least one London Public Library, in supplying books printed in large type for the use of children with defective sight. But whatever may be the practice adopted in or out of school, it is imperative that the eyes of the children should be frequently examined and immediate steps taken to modify the treatment if the eye conditions show sufficient cause.

(a) Size and Character of Type for use in Schools for the Partially Sighted.

The Committee are agreed that books for general use in schools for the partially sighted must be printed in type that is larger and clearer than the type in common use for printing school books. We have therefore to consider the following questions :—

- (a) What is the most legible style of type for such books?
- (b) What is the optimum size of type?
- (c) Can the production of books in the most suitable size and type be put upon a commercial basis?

The questions of legibility and optimum size of type must be considered separately. A Report, published in 1926 by the Medical Research Council, entitled "Legibility of Print" (R. L. Pyke, M.A.), lays down that the ideal type "should be simple, fairly broad, with fairly thick limbs, but not too much contrast in thickness and thinness, and with fairly wide spacing." The same Report states, however, that extremely large typographical differences must be present before it is possible to say that there is any difference in the objective legibility of types. Slightly differentiated types will be "legible" according as they suit the individual preferences of the reader. These general criteria on the style of print are similar to the recommendations made in a "Report on the Influence of School Books on Eyesight" (the British Association Report, 1913). This Report states that the type should be clear-cut and well defined, and that condensed or compressed type should not be used. Whites and blacks should be well

balanced, and the general form of letters should be broad and square rather than elongated vertically. Great contrast between thick and thin strokes should be avoided. Through the courtesy of the Times Publishing Co., the Committee have had the advantage of examining five different styles of type, each style being printed in three different sizes, viz. :—14 point,* 18 point, 24 point. One style of type which appears to fulfil the conditions detailed above is that known as “Garamond Bold,” specimens of which are reproduced on pages 191-194.

We have still less definite information concerning the optimum sizes of type which should be read by myopes. There is no evidence to shew that the danger of reading print ceases if that print is, say, 24 point or more. We can only fall back on the general principle already stated, that if a child can read print easily and without fatigue at a distance of about 14 inches from the eyes then the danger of excessive convergence is negligible. We must try therefore to determine the size of type which is compatible with the above conditions, and at the same time small enough to enable books to be produced on a commercial basis. The books of the American Clear Type Publishing Co. are printed in 24 point type. We learn, however, that opinion in U.S.A. is veering in favour of a rather smaller print of 18 to 20 point for general use by partially sighted children. Further, from investigations made by certain members of the Committee, it appears that there are few, if any, myopes in schools for the partially sighted who cannot read without difficulty print of 18 point held at a distance of about 14 inches from the eyes. On the other hand, for younger children larger print is preferable. In the process of learning to read they pay much attention to the detailed structure of the letter, and in order to get larger images they tend to peer closely at the book or printed matter even though by so doing the images are blurred. The “Report on the Influence of School Books on Eyesight,” already referred to, recommends that in the general instruction of young children with normal sight up to the age of 7, teaching by word of mouth with the help of large printed wall sheets, pictures, and blackboard writing is preferable to teaching by printed matter. This recommendation applies with even more force to young partially sighted children and its application could be extended to children aged 8 or 9 in the special schools.

Once the ability to read is acquired it is carried out largely by the recognition of combinations of letters into words or phrases as wholes, for which less detailed observation of individual letters is necessary. The reading of words composed of very large letters involves an increased number of fixation movements of the eyes and thereby adds to the fatigue. It is necessary therefore for the print to be large enough to be easily legible, and at the same

* For an explanation of this term see Appendix G, page 185.

time small enough to permit of the recognition of words and phrases with the minimum number of fixation movements.

In Appendix G we have set out at length some notes on researches into the legibility of print, because it seems to us important to realise that no satisfactory technique has yet been evolved on which scientific conclusions as to the legibility of type can be based, and that there is no scientific evidence to show when the danger point is reached in the reduction of size of type. But these considerations need not prevent empirical judgments. With regard to the question of legibility we find ourselves in general agreement with the Committee of the British Association ; with regard to the question of the optimum size of type for use by partially sighted children it is far more difficult to express any definite opinion, but on the whole we think that in the present state of knowledge of the subject, a type of 18 point may be regarded as meeting all reasonable requirements for this purpose.

The recommendations of the Committee with regard to the use of printed matter in schools for the partially sighted are as follows :—

(i) Until the children reach the age of eight years books should be very sparingly used and the teaching should in the main be done by the aid of blackboard writing and the large hand-printed material now commonly in use throughout the schools for the partially sighted. In so far as it is considered necessary or advisable to supplement these means of teaching, readers printed in 24 point type should be used.

(ii) The bulk of the text books for use by older children in schools for the partially sighted should be printed in 18 point type. This type can be read by the majority without danger, though there may be a few who on account of severe defect in vision need books in a larger type, say, 24 point. The use of type of a size smaller than 18 point need not be prohibited entirely if the reading of such type is strictly limited to a very short period, e.g., for the purpose of taking down a problem from a text book.

The Committee can merely set out their recommendations with regard to the size of print which can be used in schools for the partially sighted. They are unable to determine whether the production of school books conforming to the conditions laid down above can be put upon a commercial basis. It appears on general grounds that by a reduction of the very large type to one of reasonable dimensions the production of books could be made a practicable and commercial proposition. It need hardly be pointed out that if the embargo on printed matter in schools for the partially sighted is lifted, as we hope to see it lifted, the demand for books will be greatly increased. The Committee can but express the hope that the publishing firms in this country will investigate the commercial

aspects of the production of books for use in special schools for the partially sighted and will eventually see their way to make available standard educational and literary works which at present are denied to the vast majority of partially sighted children. We suggest that the publishing firms would be greatly assisted if the Board of Education were to set up a small Committee, on which these firms would be represented, to draw up a list of suitable books.

(5) *The Problems of Handwork.*

In considering the place that handwork should play in the education of the partially sighted the chief danger to be guarded against is that which arises from extravagant claims, whether these come from faulty theory or from an imperfect understanding of what it is practicable for teachers or pupils to accomplish under the conditions that obtain in the schools. The claim that handwork should play a substantial part in the education of all children is now so firmly established that we need not repeat the arguments for giving it prominence in the curriculum of the partially sighted; but the doctrine that handwork can be the chief medium of education is far less securely founded. Education must necessarily deal with both the mastery of materials and the mastery of ideas, and while it is true that mankind has arrived at its system of ideas through long experience with material things, many ideas of fundamental importance are now so far removed from the materials and experiences from which they were originally won that it would be folly, if indeed it were practicable, to try to recapitulate with the young all the steps by which the race has achieved them. The techniques required for the mastery of ideas and the mastery of materials are so different that neither can now take the place of the other; few teachers are equally competent to deal with both, and children vary very greatly in their capacity for acquiring each of them. Handwork is an invaluable complement to, but cannot be a substitute for, the academic side of education, and to pretend that by teaching a multiplicity of crafts one can impart a liberal education is only self-deception.

In dealing with the problem of handwork the two chief questions are "What is the main purpose that handwork serves?" and, "What crafts can best serve this purpose for the partially sighted?" The answer to the first must take account of two different aspects of craftwork, namely, the habit of thinking coherently in terms of the material to be used, and the acquisition of manual skill. The two essentials are that the *process* shall be worth while, in the sense that it makes adequate demands on the child's powers of thought, and that the *product* shall justify the expenditure of labour and materials. No craft deserves a place in the curriculum unless it cultivates a full measure of thought and skill, but when one is concerned with educational values one tends

to emphasise the former more strongly because of the mental discipline involved in planning. The main purpose of handwork then is to train children to be able to conceive a piece of work, to formulate in their minds all the steps in their proper order that lead from the raw material to the finished product, and then to submit their plans to the test of whether their hands and the materials conform to the terms of their thinking. Sometimes they will do better than they think, for it is one of the charms of craft-work that a happy accident or sudden improvisation will give an unexpected glory to the object that is being fashioned. But in the main success only follows understanding and skill, and the finished product is an unflattering critic of its author. Skill with the hands can be acquired only by a process of repetition, in the early stages of which the hands are controlled by a conscious purpose of the mind, but as skill increases the mind is freed from conscious control. If then the mind is to be kept active throughout a long course of manual training there must be a progressive acquirement of particular skills and new combinations of these to serve larger and more complex constructive processes.

All this is common ground for partially and fully sighted children and in respect of the purpose of the work there seems to be no profound difference beyond the need to provide for the partially sighted children profitable alternatives to unbroken periods of reading and other occupations that involve eye-strain. The more important specific problem relates to the nature of the crafts that are best suited to the partially sighted, and here one must consider first the intrinsic value of the various crafts. Not all are of equal worth; some indeed are trivial or merely serve a passing fashion. The major crafts are concerned with the greater human necessities, the provision of food, clothing and shelter, and although many of them are now mechanised beyond the hope of any wholesale revival of home-crafts in the immediate future, yet so long as homes and families and gardens remain most men and women will be the better for the ability to meet the routine manual demands of domestic life and the minor emergencies of the household and garden. For this reason cookery and housecraft, the elements of working in wood and metals, and the arts of gardening have an unassailable claim for first consideration.

Examples can be found in the schools for the partially sighted of good work in each of these major crafts and their practicability can be taken as established, though the limitations imposed within the crafts on operations that may be harmful to sight are subject to considerable variations. In woodwork, for example, some authorities forbid the use of scales that are graduated in measures of less than $\frac{1}{4}$ -inch, which is too coarse a measure for good craftsmanship; others do not observe this limitation, holding that momentary periods of concentration on the ordinary carpenter's rule do not

involve the dangers attached to prolonged poring over fine graduations, such as is necessary for accurate drawing to scale. In gardening there is probably a case for forbidding to certain high myopes prolonged stooping and some forms of strenuous work such as heavy digging, but this prohibition need not go beyond individual cases specified by the ophthalmologist. It has been usual to omit laundry operations from the girls' domestic science work, because of the dimming of spectacles by the steam, but it is at any rate possible that this difficulty could be overcome by means of an anti-dimming preparation for the glasses. Amid the present uncertainties it is impossible to lay down authoritative rules; the matter of prohibitions is one that calls for more detailed examination and experiment, controlled by a careful discrimination as to the varying capacities of the individual children concerned.

In needlework all forms of fine sewing, especially with fine threads on materials of the same colour, should be forbidden to myopes, but there are many kinds of large stitchery worked in coarse wools with large darning needles that present little danger if used with discrimination. Such work is freely permitted in some schools, though not necessarily to all children. It is desirable, too, that most of the girls should learn such simple operations as sewing on buttons and tapes; the difficulty of threading needles can be greatly lessened by the use of needle-threaders. But sewing in all its forms must be treated with great care, and practised only for short periods. Knitting, however, offers a wide and fairly safe field of work, especially if it is taught, as is the best practice of schools for the partially sighted, by touch rather than by sight. It gives opportunities for a wide range of exercises in construction and also in design both in types of stitchery and colour, and as we know from the testimony of the best teachers, it can form a most useful and fascinating form of training for girls.

There are other crafts, notably weaving, pottery (with clay-modelling as an introductory stage), basketry and bookbinding, which satisfy the criterion that they provide a progressive series of different skills and demand a sufficient measure of thoughtful planning. All these again are to be found on the lists submitted by teachers of manual occupations in use, though in some of them, for example, bookbinding, certain operations such as stitching are performed only by selected children, and in weaving the setting-up of the looms presents difficulties. These crafts, though the scope of their application is not so wide as that of the crafts mentioned in the previous paragraphs, are valuable as school occupations and have an appeal to some children that will outlast their school life.

One craft, beaten metal-work, which does not appear in the teachers' lists, may perhaps be worth mentioning because it illustrates the principle that for some purposes the sense of touch may be as finely discriminating as the sense of sight. In testing, for instance, the shape of the rim of a circular ashtray or the contours

of the bowl of a spoon the fingers may tell one as much as the eyes. In this craft, as in others, expert workmen who have full sight depend upon their fingers for testing surfaces, shapes, and gauges; and the admonition, "Shut your eyes and feel it," should be frequently on the lips of teachers of craft-work in schools for the partially sighted.

On the question of choice of crafts it remains only to say that among the other crafts mentioned in the teachers' answers to the questionnaire are several which because of the slight demands that they make on the intelligence, or the narrow range of the manual operations they involve, should have only a minor place in the curriculum. It is not suggested that, for instance, stool-seating with sea-grass, coarse rug-making, or decorative work with raffia should be wholly eliminated. Such occupations have their place in the education of children of less intelligence, of whom there are many in the partially sighted schools, and even in that of normal children in those intervals when a relaxation from the severer tension of ordinary school work is desirable. But when, as is sometimes found, crafts of this type form the bulk of the manual occupations given to the children, it is impossible to admit that the conditions that justify the inclusion of handwork are being fully met.

A great deal of incidental handwork can be, and is rightly being, done as an adjunct to the ordinary subjects of the curriculum, such as History, Geography, Literature, Science, or Arithmetic. This work is specially suited to the junior children because of the great variety of materials and methods it can be made to comprise at a time when the children are scarcely ready for the formal crafts. The spirit in which this work is conceived and executed deserves a fuller recognition in the development of the later stages of craftwork, for all such work is at its best when it springs unforced from the needs and occasions of a rich and varied school life.

A word is necessary as to the balance of the subjects in a craftwork syllabus. The time usually allotted to the subject permits the development of several crafts to a reasonable degree of proficiency. It is suggested that an ideal of all-round handiness should be aimed at; a boy, and in some measure a girl, too, should be able to use all the common tools, to tackle the small jobs of fitting and construction that crop up in any house, and to cope with the lesser troubles in the gas, water, or electrical supply; a girl should be able to serve the most essential needs of her own person and of the household. Training of this kind meets a more universal demand than a course which aims at a very high degree of perfection in a limited number of specialised crafts, which may unfortunately be abandoned when school life is over.

(6) *Physical Education.*

On the grounds of general principle and the special needs of partially sighted children we place the subject of physical education in a place of pre-eminence in the curriculum. Partially sighted

children are prone to many faults of posture and movement and are inclined to be less active and more sedentary in habit than children who possess normal sight. They are unable to share in the most vigorous games and are in many ways made conscious of the disadvantages at which their defective sight places them. It is therefore the more important that they should be encouraged to get the best out of the activities that are permitted to them, and that they should acquire the habits of erect and confident carriage and easy, controlled movements. The schools should do all they can to foster a love for active exercise and outdoor pursuits as a counter-attraction to reading and other sedentary occupations.

The Physical Training Syllabus recommended by the Board of Education for use in the ordinary schools is also used in the special schools for the partially sighted, but almost invariably with considerable restrictions, the chief omissions being as follows :—

All exercises in which the body is fully bent forward and downward, all jumping that includes landing on both feet (e.g., such movements as turning to right or left with a jump, placing the feet astride with a jump, skipping with both feet together), the more vigorous kinds of jumping with landing on one foot, such as "Giant Strides," nearly all kinds of hopping on one foot, e.g. "Tapping Step" (a preliminary to dancing, though dancing is allowed), all quick knee bending and stretching in the standing position, most of the head movements, the more energetic arm movements, lunging exercises and some others.

Folk Dancing is permitted in some schools; games with soft balls are allowed but not in company with normal children; and swimming is usually permitted, but not diving or swimming under water. Boxing is prohibited, and football on account of the risk of injury from "charging." The actual performance of the exercises is considerably slowed up, and there is much less "snap," vigour and precision in carrying them out than when performed by fully sighted children in the ordinary school.

On behalf of the Committee the Board's Staff Inspector of Physical Training, Captain F. H. Grenfell, inspected and reported on the physical training in 11 schools for partially sighted children conducted by six different Local Education Authorities.

Captain Grenfell found that in the majority of these schools a low standard of efficiency prevailed. In some schools this is due to restrictions imposed by the ophthalmic surgeons on the nature of the exercises, and more particularly on the method of carrying them out; in others it is due to lack of guidance from the ophthalmic surgeons and School Medical Officers on these matters, with the result that teachers have become over-cautious, and in playing for safety have rendered the physical training instruction valueless. The poor results obtained are due not so much to the exclusion of

certain exercises from the curriculum as to the lack of vigour and precision with which the permissible exercises are performed.

We give below two excerpts from Captain Grenfell's report and his full notes on two schools. In the first the physical training is, in spite of the omissions from the Syllabus, effective and valuable; in the second the training is rendered valueless by the spiritless way in which it is carried out.

"It is only fair to the teachers to say that the segregation of these eye cases in separate schools and classes creates considerable difficulties in the organisation of the physical training. The numbers in any school are for the most part so small that children of widely different ages have to be taught together, and either the older boys and girls cannot be separated, or, if this is done, it accentuates the disparity of age in the upper classes. In these circumstances it is impossible to employ a really satisfactorily graded scheme of exercises or to make suitable provision for the divergent needs of the older boys and girls. There is the further handicap that these small schools are generally at a disadvantage in the matter of facilities, especially as regards indoor accommodation, without which reasonable continuity in the training cannot be secured in our uncertain climate. When to these difficulties are added those arising from the children's defective eyesight, it will be realised that the teachers began with a fairly heavy handicap. If they are to do their best for the development of the children's bodies they must be given the clearest possible guidance not only as to what modifications must be made in the normal syllabus for the sake of the children's eyesight, but also as to how the permitted exercises can be used to the best advantage. In neither respect at present do they get sufficient help."

"The special supplement to the syllabus designed to suit the conditions in very small schools (mostly found in rural areas), and entitled "Physical Exercises in Rural Schools," would be more suitable for most of these Partially Blind Schools than the Syllabus itself, yet only one school has been advised to use it."

School X.

"This was one of the largest schools visited, and approximated more closely to the organisation of a normal urban school. There is a fine Hall, an outdoor exercising ground and a playing-field, somewhat rough at present.

All the children wore shoes for the exercises, and these are provided by the Local Education Authority.

The Board's Syllabus is employed quite suitably in the case of this larger school. Some omissions are made, e.g. 'grasp the ankle', crouching position, trunk bending downward, forward and sideways, and a few other movements that cause unnecessary jolts and jars, such as sitting down on the floor with a bump. These

omissions have been made by the Head Master on his own initiative, as the School Medical Officer has placed no restrictions whatever on the use of the Syllabus. The Head Teacher acts on the belief that the exercises should be conducted with all the vigour that would be expected in a normal school. The children are encouraged to put all their energy into the work. Jumping and skipping of all kinds are practised, football and cricket and other games such as Fives, Rounders and Stoolball are played. Folk Dancing is taught and swimming to the children over 10 years of age. The children are bright and active and happy in their work, and are deriving great benefit from it.

The Head Teacher attaches great importance to the development of games for myopes as a means of counteracting their tendency to acquire sedentary habits and to shun the company of normally active children. He claims to have had 16 years of experience of these methods and no accidents.

The success of the physical training in this school is largely due to the fact that the Head Teacher is not weighed down by an undefined threat of danger which seems to paralyse the activities of many of the teachers in other schools visited."

School Y.

"There were 66 children under 3 women teachers. The children are taught physical exercises in two mixed groups, the ages of the junior group ranging from 5 to 13. One assistant teacher is chiefly responsible for the physical exercises and games, and the other for folk dancing. There is a small but useful Hall and a good playground.

The children stood up fairly well when called to attention. This appeared to be the only satisfactory result obtained from the physical training lessons. The damping down process had gone so far as to take all the vitality and usefulness out of the work. The performance was feeble in the extreme, the marching was dreadfully sloppy, the games were spiritless. The folk dancing, however, was good, and was enjoyed because it was not regarded as something full of dangers, and could therefore be carried out in the normal way."

In physical training, as in reading, instruction in schools for partially sighted children has been overshadowed by considerations which apply with special force only to certain highly myopic children. The modified Syllabus is applied to all children irrespective of their eye condition, i.e. myopes, high or low, and non-myopes. It would appear that the amended Syllabus is designed particularly to obviate the danger of immediate detachment of the retina, a danger which is present in very few children in special schools. The bending exercises are omitted with a view to avoiding the risk of congestion of the veins of the head, which indeed

may have some influence on the progress of myopia. On the other hand, it should be emphasised that the development of a good physique, posture and carriage is of much importance in the treatment of myopic children more especially as myopia is often associated with faulty growth and subnormal nutrition. For this reason the physical training of myopes should be encouraged to the greatest extent consistent with safety of the eyes.

The Committee view with the gravest concern the limited scope and effectiveness of physical training in the schools for the partially sighted. They are convinced that the possibilities of effective physical training are far higher than any that have been attained in most of these schools, and that, although great care must always be observed in the games and exercises of partially sighted children, the present unwholesome preoccupation with disabilities must be eradicated. Besides consulting expert witnesses who have appeared before them, the Committee have been in correspondence with various ophthalmic surgeons and School Medical Officers in different parts of the country concerning the scope of physical training suitable for partially sighted children. After weighing the evidence very carefully, the Committee have formed the opinion that the majority of children in partially sighted schools may pursue without danger the normal Physical Training Syllabus, with the exclusion of certain exercises which will be detailed later, and may with safety be allowed to perform the exercises with the customary "snap" and vigour with which they are carried out by fully sighted children in the ordinary schools.

The recommendations of the Committee with regard to Physical Training are as follows :—

(1) Myopic children with fundus changes indicative of a serious condition of myopia, or with myopia of more than, say, 10 dioptries should continue to be given physical training with the restrictions indicated on page 88. Such children will be selected by ophthalmic examination.

(2) Myopic children, with the exception of those mentioned in (1), may pursue the full Physical Training Syllabus with the exclusion of exercises which involve sustained bending of the body forward and downward. The method of carrying out the exercises should be the same as that pursued by fully sighted children in the ordinary school. It is very important that the breath should on no account be held during the exercises, and that lightness and rhythm in movement should be cultivated.

(3) Non-myopic children may pursue the full Physical Training Syllabus as followed in ordinary schools.

As explained in Chapter V, the Committee look forward to a much closer relationship between the special school for partially sighted children and the ordinary school. Where the principle

of "non-segregation" is adopted, groups (2) and (3) should join fully-sighted children in physical training, the syllabus being slightly modified for individual children in accordance with (2). Group (1), however, must perforce follow such a very restricted syllabus that whatever exercises are allowed must be given by the teacher of the special class.

In the larger "segregated" schools it will probably be found convenient to group (2) and (3) together and pursue the modified syllabus suggested in (2). Although the non-myopes would thus be denied certain exercises which they may do without risk, the Syllabus will suffer little from these exclusions, if the method of performing the permissible exercises is satisfactory.

B.—Class Organisation in Schools for the Partially Sighted.

(1) The Non-Segregated School.

The Committee's recommendations in Chapter V foreshadow an increase in the number of classes for partially sighted children that form an integral part of ordinary schools, and we think it well to state clearly our conception of the relationship that should hold between such classes and the schools to which they are attached. For reasons arising out of the Grant Regulations the partially sighted children will be entered on a special Register, but each one of them should be a member of an appropriate class in the ordinary school and should share as fully as his vision and general abilities permit in the lessons and other activities of that class. The special class should be complementary to and not independent of these ordinary classes, and should provide only for those occupations that are incompatible with the daily routine of a class of children with normal sight. The teachers of ordinary classes to which partially sighted children are attached should be no less concerned with the progress and welfare of the partially sighted children than with those of any other member of their classes. The difficulties encountered in previous experiments in non-segregation have arisen from the fact that partially sighted children have been regarded as interlopers in the ordinary classes; teachers of these classes have been known to disavow responsibility for their progress, and special class teachers have been harassed by the feeling that they had to make good all the deficiencies that followed upon this imperfect co-ordination of responsibilities. Such misconceptions as these are fatal to the interests of the partially sighted children.

The extent to which partially sighted children can share the activities of an ordinary class will vary with their visual capacity and their intelligence; the more they differ from the normal in each of these respects, the less will be their capacity to profit from ordinary class instruction. Again, the younger partially sighted children will spend proportionately more time in the special class than the older ones, because they need more individual attention

than the teacher of an ordinary class can afford to give them, especially in the primary subjects of reading, writing, and arithmetic, for which special equipment is needed. As they grow older they should attain an increasing degree of emancipation from the special class, especially if their intellectual attainments are such as to enable them to maintain an equal footing with their fully sighted companions of the same age. If they fall short of this standard of equality they will have the resources of the special class to fall back upon. The principle that we are seeking to establish is that if, by taking into the ordinary classroom his special equipment for writing, a partially sighted child can without undue effort or disturbance of the class routine maintain the normal pace of lessons that require written work he should be allowed to do so, whether the work relates to arithmetic, or formal composition, or is merely incidental to oral or practical work. On similar terms, too, he may be allowed to do individual work in art, crafts, or practical science suited to his visual capacity, along with the other members of his class, where the school possesses properly equipped art-rooms and practical rooms. It may be that children who can be permitted to share so fully as this in the work of the ordinary class will be very exceptional, but Head Teachers should assure themselves that every partially sighted child is sharing to the full limits of his capacity.

Oral lessons along with ordinary children present less difficulty than written or practical lessons, and it is these that the partially sighted children will commonly share most fully; in this connexion the suggestions made later in this Chapter on special equipment should be carefully considered. But it has to be recognised that subjects like literature, history and geography are learnt in part through the silent study of books, and this fact creates a real difficulty, since as a rule the partially sighted children will not possess in large type a full range of the text-books commonly in use. The teacher of the special class will sometimes be able to help by reading to a group of children allotted to a single class portions of the text-books in use; sometimes, too, it may be possible to pair the partially sighted child with a good fully sighted reader who will read aloud to him the matter set for private study; but possibly the main hope in this direction lies in the eventual provision of a series of text-books in large print, which, although they may not conform in detail to the books in use by the children with normal sight, will nevertheless contain the main body of information on facts and principles that a child should possess on leaving school. The selection of text books for printing in large type is a matter that calls for the serious attention of all who are concerned with the education of the partially sighted.

The special class will have a special responsibility towards those children who suffer, as unfortunately not a few partially sighted children do, from some form of congenital mental inferiority.

These children it is always difficult to fit into the ordinary class system; the normal occupations of the classroom do not suit their interests or needs, and they require a larger measure of individual attention than normal children. They will probably need during the whole of their school life the additional guidance and the greater freedom that only a special class can give them, though they should not be wholly cut off from the main stream of school activities.

(2) *The Segregated School.*

Although we look forward to the establishment of more non-segregated classes, we do not anticipate that the segregated school will vanish, but we hope that the number of very small schools will decrease. One of the greatest difficulties in segregated schools has been that of securing a satisfactory form of organisation. Where the numbers are small and the staff is limited to one, two or three teachers, there must of necessity be a considerable mixture of age-groups in each class and there is usually a good deal of overlapping of age-groups in successive classes. Such conditions as this are, however, quite familiar in our school system, for example, in the small rural schools, and in general teachers make a fair bid to overcome the difficulties by treating their classes in sections as far as possible. But in the ordinary schools the devices used for securing sectional treatment usually depend upon the fact that one or more sections of the class can be set profitably to work at exercises in silent reading or writing, while the remaining section is receiving oral instruction or special teaching from the teacher. In these respects the teacher of the partially sighted is severely handicapped and consequently it is characteristic of the schools for the partially sighted that grouped oral instruction of classes of children of widely varying abilities and interests is very common. This indeed is the main educational reason for desiring the elimination of the small segregated school, which only under the rarest conditions and under exceptionally gifted teachers can be made an effective instrument for education.

Where the grouping of children of various ages is unavoidable there are certain principles that should be observed. If a child has to remain for several years in a particular class he should not, as sometimes happens, have to repeat the same syllabus year after year. He should, of course, revise each year the essentials of his previous work, but he should also have fresh work. It is admittedly hard in a grouped class to provide for all the children work that is new and at the same time more difficult than previous work, but means must be sought, as is already the practice in the best schools, to give the older children of the group some share of private instruction in the more advanced parts of literature, history and geography. This may perhaps be done in the ordinary lesson periods while the junior members of the class are reproducing

something of the matter of the lesson or are engaged on illustrative drawing or handwork, or at other times when the rest of the class can be profitably occupied. Yet even in this one must recognize that the possibilities are limited because of the undue strain on the teacher's voice caused by continuous talking. Matters would be greatly simplified if it were possible to give the children separate text-books for limited periods of private study.

C.—The Curriculum.

In the sections that follow the educational problems of the partially sighted are looked at from the angle of the segregated school. We realise that in the non-segregated school the requirements of the children with normal vision will determine the main outlines of the curriculum and that adjustments to meet the special needs of the partially sighted will be chiefly adjustments of method. But we think that even for teachers in the non-segregated school it is expedient that we should present a detached view of the special needs of partially sighted children and of the manner in which these needs can be met in schools that give them exclusive attention; for by reference to these independent standards the teachers in non-segregated schools will best be able to direct their attempts to cater for the partially sighted and to measure the success of their efforts.

Although among the partially sighted children there are some who see the world but dimly, many of them see quite clearly with the aid of glasses. They have the same interests in the world as their fully sighted fellows and the same educational needs. Their schools must not be regarded as a shelter from the rigours of the ordinary school, but as places where the task of preparing children for life is no less seriously undertaken than elsewhere in the school system. We must approach the problems of their curriculum by recognising that their mental life is essentially normal, though the task of acquiring knowledge presents difficulties to them that ordinary children do not have to face.

The curriculum then will be substantially the same as that of the ordinary school, though the emphasis on particular subjects will be differently distributed. None of the broad categories of human knowledge and activity that form the basis of ordinary education can be ignored. A place must be found for acquiring an adequate command of spoken and written language, for literature, history and geography, for mathematics and simple science, for craft work, music and art. The general aims of the curriculum will be to give the children a simple knowledge of the world in which they have to take their place, of the influences that are at work there and the enterprises that are afoot; and to equip them with reasonable skill in using the means of acquiring, communicating and recording knowledge, while giving them at all stages and in all subjects the opportunity of doing some creative work. The general principles controlling the teaching of the various subjects

will be those which govern the best practice of elementary schools, but oral work will be more prominent and special devices for illustration will have to be used. An intelligent reading of the Board's " Suggestions for Teachers " and the reports* of the Consultative Committee on schools of various types, will supply the main body of professional knowledge and doctrine that the specialist teacher of the partially sighted has to adapt to his particular problems. It is therefore unnecessary to consider here in detail the general question of aims and methods of teaching and we confine our suggestions to matters that are specially important or that present special difficulty.

We wish again to emphasise here the significance of the fact that the Committee has advocated the loosening of certain restrictions that have hitherto fettered the activities of the teachers. The many representations that have been made by the teachers themselves on this feature of their work leave us in no doubt that they will use their greater freedom to improve the standards of educational attainment in their schools. In the hope of such improvement lies the only justification for the changes that have been suggested.

(1) *Speech Training.*

One of the first concerns of teachers of the partially sighted should be to mark out for special attention those fields of educational activity in which the children are at no disadvantage as compared with children whose sight is normal. By so doing they will help to narrow down to its utmost limits the danger area in which feelings of inferiority are bred, and to establish in the children that consciousness of essential normality that it is so important to foster. One such field is that of speech training. Speech training means far more than teaching children to speak grammatically and in pleasant voices that give proper values to vowels and consonants and the more complex sound patterns of pronunciation and phrasing. It means primarily the formation of speech habits that will fit the most commonly occurring social situations. It will be built upon good practice in using the common courtesies and conventions of speech and the ordinary conversational gambits and endings; and its purpose will be to enable children to talk with friends and strangers on equal terms without being abashed or inarticulate. Fundamentally it is the kind of thing that young children learn through dramatic play, when they assume in turn the characters of shopkeeper and customer, teacher and pupil, host and guest, strict parent and naughty child. It should make the children ready to adapt their speech to the company and occasion in which they find themselves, whether the occasion be that of

* The Education of the Adolescent. Price 2/- net.
 The Primary School: Price 2/6 net.
 Infant and Nursery Schools: Price 2/6 net.
 Published by H.M. Stationery Office.

a Parents' Day, a class debate, or the production of a school play, or the company that of a playfellow, a distinguished visitor, or a prospective employer. Ready and confident speech is one of the best passports to society, and good speech training offers one of the most promising means of enabling a child who is otherwise handicapped to make the best of his personality in intercourse with his fellows.

Apart from all this, speech training has in the schools for the partially sighted a special pedagogic value. The children have to learn from the spoken words of the teacher much that other children learn from books, and so it is even more essential than in the ordinary school that the children should be trained to listen attentively, to remember and reproduce what they have heard, and to express their own thoughts about it in correct and fluent speech. The arts of memorising spoken words and of re-telling the gist of what has been said should be practised daily, and as the children grow older they should learn to listen for longer periods and to reproduce at greater length what has been said. As a rule the children will have few written notes for revision and no great store of reference books, and so frequent repetition by the teacher of salient points of the lessons and oral recapitulation by the children will be needed to make the children's knowledge permanent. We must, however, enter here the caution that the teacher's voice is a human instrument that cannot be used continuously without strain, or even without the danger of its becoming ineffective because the children become too accustomed to it. Oral lessons, then, must not be so long or so frequent as to incur these dangers.

These considerations have an important bearing on the choice of teachers for service in schools for the partially sighted. Preference should be given to teachers who have wide interests and can talk effectively about them. The children will depend in a great measure upon their teachers for knowledge of the world outside their immediate surroundings and of the things that are happening there day by day, and the teachers should therefore be able to talk well enough to enlist the children's interests in a far wider range of topics than one finds in the ordinary syllabus of professional training.

A good deal of the printed matter in use in the schools should be chosen with a view to its suitability for being rendered in living speech. In particular a strong claim can be made for including a more than usually large proportion of dramatic literature that the children can commit to memory for producing plays, which, if properly chosen, give a more natural setting for rhetorical speaking than the recitation of prose and verse.

We need make no apology for giving so much prominence to speech-training for the partially sighted. What we have said accords with our general views on the humanistic aspects of their education, and it is in line with movements that are taking place in many

schools today. A great deal of work is being done on the mechanics of speech production and on the adaptation of speech to the needs of life, and teachers of the partially sighted have good reason for taking a full share in these movements. Being dependent in so large a measure on the effectiveness of their oral instruction they might make a valuable contribution to our knowledge by investigating the growth of children's ability to attend to and profit by oral lessons, a subject of which we have as yet far too little definite knowledge, but one which needs careful investigation if for no other reason than its bearing upon the increased use of wireless broadcast lessons.

(2) *Reading.*

As indicated in a previous section of this Chapter we look forward to a relaxation of the restrictions on reading in schools for the partially sighted, and we wish to substitute the ideal of training the children to read wisely for that of discouraging them from reading. But the time to be devoted to reading will still be limited and the available stock of reading matter will for a long time remain small, and so it is of the first importance that what the children read shall be really worth reading. To put cheap and ephemeral reading matter into the expensive form required by the partially sighted would be an indefensible waste. Publishers of large type books will naturally be concerned that there shall be a steady and continued demand for them and this is more likely to happen if the matter has already stood the test of time, or is likely to find a permanent place in our national store of children's literature. The accumulation of a large stock of books is most desirable, but since this must needs be a slow process it is essential that the books that are acquired shall be really good. The value of a good book is by no means exhausted by a single reading and such a book repays far better than an indifferent one the time spent in getting to know it thoroughly.

A good deal of reading aloud by the children will be done in the partially sighted school in order to give them practice in clear and expressive utterance. For this purpose printed matter with which they are wholly unfamiliar should not be used, especially in the earlier years. Reference has already been made under speech training to the need for a good stock of dramatic literature. Silent reading for enjoyment and for gaining a general knowledge of literature should not be casual, but should be planned in such a way as to cover the body of literature which the teachers think that every child should know. The choice of books for reading for information in such subjects as history, geography or science presents real difficulties because modern school books in these subjects are so numerous and differ so widely in value and view-point. The popularity of many school text books is short-lived, and until it is possible to reach a general agreement as to what text books should be put into large type it may perhaps be the better policy for

teachers to accumulate a library of well written biographies, books of travel and exploration, and other such matter of permanent value for the children themselves to read, and to keep the text book for their own personal guidance in arranging the syllabus.

In schools for the partially sighted a good deal of time is spent by teachers in reading to the children. It is not uncommon for this practice to lose much of its possible value because the matter read is of a trivial character. The purpose of the work should be seriously considered and the course of reading carefully planned. The time thus spent should be used for making the children acquainted with good books that are not available for general class use or that present difficulties of language which might deter the children from reading them unaided, for forming their tastes in prose and verse, and for training and testing their powers of concentration. But although it is essential for success that the work should be properly planned this does not exclude a wise opportunism in using vivid literary extracts to illustrate lessons in history and geography, or good newspaper or magazine articles that bear upon daily activities.

It is of the greatest importance that teachers should realise that the most scrupulous care must be given to the reading of the younger children both in respect of the size of print and the duration of their lessons, so as to avoid the formation of injurious habits and to safeguard against strain. Teachers of infants would be well advised to restrict the reading material to blackboard work or to hand-printed matter of the large size now current in schools for the partially sighted until the children have acquired the habit of keeping their reading matter at a safe distance from their eyes. With myopic infants it is better to postpone reading altogether if there is any sign that they are unable to recognize words without peering and stooping.

(3) *Writing and Composition.*

The materials and methods used for teaching partially sighted children the act of writing have been designed mainly for the purpose of making children sit upright and keep their heads well away from the writing surface. Details relating to this matter are discussed in Section D of this Chapter. The writing done under these conditions is large; the process itself is much slower than ordinary writing and in consequence the output is small. We think that correct posture and consequent avoidance of eye strain must always be the first consideration, though we do not wish to lay it down as an invariable rule that partially sighted children, myopic and non-myopic alike, must always follow the practice now commonly in use.

If, as the Committee recommend, the older partially sighted child is to do some of his writing in the same classroom as normal children it would be well to make the differences in method of

writing as small as possible. It is inevitable that the partially sighted child who writes free arm on a nearly vertical surface will be different, but if he writes on an open sheet, or still better, on a sheet folded in two into the *form* of an exercise book, even though it be 10 in. by 15 in., or even larger, he will not appear to his fellows so different. If writing somewhat smaller than at present in vogue be permitted, say about half an inch in size, a sheet of paper of this type would hold almost any exercise the child would have to write except a composition, which might require two or three sheets.

We do not anticipate that partially sighted children will in any circumstances do as much writing in school as ordinary children do. If for any reason they should in later life need to write regularly or prolifically, they would be well advised to use the typewriter. Most of them, however, will need no more skill in written expression than is necessary for the ordinary round of social, household or business duties. The teacher's main concern will be to use the short time available so as to meet the children's essential needs, and to avoid whatever is of little practical use. All normal children for example, should know how to write a straightforward letter when confronted with a natural situation that requires a written communication, but a child with no literary gifts may be merely wasting time if he is made to write imaginative compositions.

The art of expression in writing is not a thing to be separated from other lessons and cultivated as a thing apart. Special lessons will of course be needed for practice in putting down in an orderly fashion and in appropriate words a simple sequence of ideas that has previously been arranged in the mind, and also for mastering the common conventions of written language, such as forms of address in letter writing or the elementary rules of punctuation. But in a large measure the written work should arise naturally out of the daily school occupations and form a normal part of other lessons. It may be used in oral lessons for giving answers to questions, for helping to impress salient points on the memory, for practising the spelling of new words and phrases, or for making simple notes. Opportunities will arise in the daily routine for recording observations or occurrences of special interest. The more the writing is used habitually to serve the natural occasions and purposes of general school activities, the more spontaneously and confidently will the children turn to its use for recording and communicating their ideas.

(4) *Arithmetic and more advanced Mathematics.*

One of the main difficulties in teaching Arithmetic arises from the lack of suitably printed books. Most teachers meet the need for a permanent stock of exercises by using hand printed cards or sheets. This entails a good deal of labour, and it often happens that the material is mainly restricted to mechanical examples because these can be expressed very briefly. Opinions vary as to the

amount of danger to eyesight involved in reading from a book of arithmetical examples. Some of our witnesses pointed out that children have to concentrate on the books for only a short time, in order to transcribe the sums to their paper or black boards; but, on the other hand, they have to look closely at the figures because each has to be recognised separately, unlike a printed word which a skilled reader sees as a whole without consciously attending to individual letters. For younger children the use of books printed in ordinary type is to be deprecated; for some at least of the oldest ones such books may perhaps be used with discretion. But the Committee feel that though much of the teaching must always be done by oral methods, the work would be better and less onerous to the teachers if a book were available that contained a stock of useful examples printed in as large type as practicable.

As in every school, there will be in the schools for the partially sighted some children who will not need to go further in Arithmetic than is necessary for mastering the tables and the simple processes and arithmetical conceptions needed in ordinary life; but these they should be able to handle accurately and confidently. The others, though they may not reach so high a degree of skill in written work as is attainable in ordinary schools, should be just as well versed in the essential ideas that underlie the more advanced work. When they grow up they will have their personal and vocational responsibilities and interests, and their duties as citizens. These things have their mathematical aspects, not merely arithmetical, but also geometrical and algebraic; and the school course should help to prepare children to understand them. But children cannot apply their mathematical skill to such matters unless they are familiar with the situations or transactions to which the mathematical data refer, and are conversant with the special vocabulary that belongs to them. Such conceptions, for example, as ratio, proportion, percentages, simple interest, investments can be introduced and thoroughly assimilated through the medium of oral exercises, and the written work in these subjects need not be elaborate and extensive; the skill necessary for protracted computations can be acquired by those who need it by other and more rapid means. Many children never learn to think properly in such terms as these, because difficult written exercises are introduced before their minds have gone through the slow process of digesting the ideas that the terms express. This should not happen in a school for the partially sighted. It is necessary, however, to point out that though the instruction and questioning will be largely oral, the answers should usually be in writing, for only thus can the teacher know how much each child in the class understands.

It is not necessary to enter into questions of teaching method in Mathematics for partially sighted children. The concrete and practical exercises necessary to give them a real grasp of the measures in common use and a knowledge of the situations to

which arithmetical operations correspond, and the repetitive work which will make them quick and accurate in calculation are just as necessary as for ordinary children. In one particular branch of Arithmetic, namely, mental work, partially sighted children should excel, though they will do so only if the programme of mental work is properly planned and graded. It should not consist merely in learning a few tricks of calculation, such as the method of finding the cost of a dozen articles at $6\frac{3}{4}$ d. each; it should comprise, among other things, graded exercises which will cultivate skill in applying the four rules to increasingly large numbers, and will give the children such a grasp of the composition and relationships of numbers and the tables of money and measures as will enable them to transform or break up complicated operations into simpler ones that can be worked in the head. It should also be directed to making them familiar with the working of sums in the common "problem" forms, and to enabling them to forecast to a reasonable degree of approximation the results of arithmetical operations that cannot be worked mentally.

(5) *The Humanities: Literature, History, and Geography.*

The teaching of the humanities should not be conceived as instruction in the separate subjects of literature, history, and geography apart from each other, but as a means of getting the children to understand something of their fellow men and of cultivating right feelings towards them. The growing interdependence of nations calls for mutual understanding of racial and national characteristics and traditions, and this cannot be reached by a study of the regional or political geography typical of the textbooks or through the onesided accounts that history books usually give of national viewpoints on past conflicts. If the teaching of the humanities is recognized as a means of getting to know the minds of others, then the contributory subjects will fall into their proper place and a coherent and effective scheme of treatment will become possible. Literature will reveal to the children how other people have looked at the world, history will show them along what paths the race has come to its present state, and geography will describe and explain the conditions under which mankind lives.

Of literature something has already been said under the heading of reading. The teaching will be effective in proportion as the choice of material has been catholic and sound, as the children's knowledge of the thoughts and characters portrayed is intimate and lasting, and as the modes of expression have become assimilated into the children's own habits of thinking. History and geography will in the main be taught orally and their interpretation will lie in the hands of the teacher. The learning of definite facts is essential to clear thinking, but if the children do not begin to understand how the historical and geographical facts learnt are

related to each other and to their own personal concerns as intelligent beings and future citizens the mere learning of facts will be of little use.

The evidence of our witnesses in regard to history and geography was mainly directed towards suggesting means of overcoming the dangers that arise from close perusal of small pictures and maps containing a mass of fine detail. In order that children may retain permanent impressions of the facts that maps and pictures display it is necessary that these things should be constantly before their eyes for considerable periods, and that the children's attention should continually recur to them in a purposeful manner. We were greatly struck with the resourcefulness that teachers have shown, especially in the making of maps. In one school, for instance, there is in the playground a map of the world, 21 ft. by 15 ft., in which the ocean basins are filled with water, the polar ice-caps represented by white marble chippings, the deserts by sand, and the various vegetation belts by growing plants, such as dwarf box, alpines, grass and thrift. On the floor of the school hall is an outline map of the British Isles, on which details are inserted as occasion arises; the children have also made a paper-pulp relief map, $5\frac{1}{2}$ ft. by $3\frac{1}{2}$ ft., of the railway system of England and Wales with the main lines shown in raised wire. Another school produces very effective maps for individual use by making a bold outline with stencil brush and paint round templates cut from maps of various countries. From all these maps names are omitted but colours and bold letters are used as indications, and a key is given in a place convenient for reference; constant and intelligent use of the key is essential to good map-reading. For general purposes of illustration boldly drawn and coloured pictorial or diagrammatic illustrations are used, sometimes made by the teachers themselves or obtained from such sources as the railway and shipping companies, or industrial firms. An enterprising teacher can quickly accumulate a valuable store of such material, a great deal of which is of more than passing interest and value and deserves the storage accommodation needed to make it permanently available for use. The task of mounting or otherwise preserving the illustrations and of indexing them under subjects and cross-headings is a most useful one for the children.

(6) *Science, including Hygiene.*

The subject of Science is too seldom found on the time-table of the schools for the partially sighted, though one Head Teacher spoke to us of its importance from the point of view of general utility. Science teaching undoubtedly presents difficulties in very small schools, and its beginnings have in the past been so frequently associated with practical measurements on the metric system that some teachers have perhaps on these grounds been deterred from attempting it. This association is, however, an unnecessary and in

some ways an unfortunate one, and where other circumstances are favourable it should not be allowed to stand in the way of introducing partially sighted children to the scientific aspects of our knowledge of the world about us. In order to lead a healthy life children must acquire hygienic habits, and they will the better conform to the rules of hygiene if they know something about the elementary science of air and water, heat and light, and the living body and its more important needs; in this connexion we need do no more than refer the teachers to the Board's Handbook of Suggestions on Health Education.* Children encounter in daily life many mechanical, electrical, optical or acoustic contrivances which arouse their curiosity and call for explanation in terms of simple scientific principles. The intelligent handling and simple repair of such things as electrical plugs, switches, fuse-boxes, bells or torches, of gas-irons, fires, or stoves, of gramophones, wireless receivers, locks, taps and the like demand a certain minimum of empirical knowledge, much of which can be imparted in school by means of demonstration or practical lessons; simple generalisations from knowledge thus acquired will make a sound basis for a fuller study of scientific theory later on.

In the earlier stages the study of plant and animal life, preferably through garden studies and the care of pets where such things are practicable, will give an introduction to the simple biology of the later years. We were reminded by our witnesses that close examination of botanical specimens is undesirable, and so when teachers want to discuss or explore the parts of a plant they will no doubt use a daffodil or tiger-lily in preference to a bluebell or forget-me-not. As an introduction to physical science the handling of constructional or mechanical toys is a great help towards cultivating in young children a mechanical sense, for the lack of which theoretical knowledge may perhaps be sterile.

(7) *Art.*

We have seen from one school some interesting and impressive evidence of an attempt that has been made to give children a natural outlet to their artistic abilities, and we think that partially sighted children should not be debarred from artistic activities provided that the media which they use are suited to work on a sufficiently large scale. Fine work with brush or pencil and object drawing that calls for close observation of form and colour are out of the question, but bold illustrative work in water-colours, tempera, crayon, or cut paper, based upon, or correlated with, rapid studies of form in charcoal are well within the capacities of most partially sighted children. The methods exemplified in the recent developments of illustrative drawing in London Elementary Schools and elsewhere might well find a place in the schools for the partially sighted.

* Published by H.M. Stationery Office, 6d. net.

(8) *Music.*

The only serious handicap from which partially sighted children suffer in respect of musical training is that they are unable to read from musical type of the ordinary size; the difficulties of reading staff or tonic solfa notation from the blackboard are not insuperable. Cultivation of the voice and the ear offer no difficulties, and if perforce the musical training is restricted in the matter of reading this should be an incentive to seeking a higher degree of excellence in other branches of music. The school life of the children will be seriously incomplete if the possibility of getting and giving pleasure from good music is neglected.

D.—Hygiene of Classroom: Equipment

We have stated in Chapter IV, Section E, our conviction that the ideal conditions for teaching partially sighted children are those which are found in Public Elementary Schools conducted on open-air lines, but these will not always be obtainable. Apart from this, the first requisite of a classroom for the partially sighted is spaciousness. For certain purposes, e.g., writing, the children require individual desks, and in general the equipment is on a larger scale than that used in ordinary schools; cupboard accommodation must also be liberal, and there must be room for free movement and for rearranging desks and tables for handwork. One of our witnesses stated that in Scotland the principle has been adopted that a room to accommodate 50 ordinary children suffices for 20 partially sighted children, and we suggest that for classes of the size usually found in the English schools, rooms of the standard size of 480 square feet should be provided.

(1) *Lighting.*

It goes without saying that the rooms should be well lighted. We have no direct evidence of the relation between illumination and the quality or quantity of children's school work, but experiments in the industrial world leave no doubt that industrial efficiency is decidedly enhanced by improved lighting; and, further, that persons whose sight is defective are usually the first to show signs of deterioration in their work as illumination falls off. It would be strange if this were not also true of school children.

No definite standard of illumination has as yet been officially prescribed for English schools, but investigators in this country and in America appear to agree that the illumination should not be below 8-10 foot-candles* at the surface of any desk for ordinary schools, and may well be substantially higher in schools for the partially sighted. Increased illumination brings with it the possibility of glare, which may be particularly distressing to defective

* A foot-candle is the amount of illumination given by a standard candle at a distance of one foot. The standard candle is a sperm candle that burns 120 grains of spermaceti per hour.

eyes. Shiny surfaces, whether of walls, blackboards, furniture or writing paper should be avoided; efficient sunblinds should be supplied; and all artificial lights should be screened by translucent globes. The upper walls should be decorated with light colours; cream or light tints of buff, grey, green or blue have been suggested, and the surface should be matt. There should be no extreme contrast between the colours of the upper and lower parts of the walls. Desks should be arranged so that the window light falls over the left shoulders of the children when seated, and lighting from the front should on no account be allowed.

On the question of artificial lighting our evidence was conflicting. Some of our witnesses thought that it was of secondary importance because in their opinion all close work should cease as soon as artificial lighting becomes necessary, since it is not as a rule possible to get a satisfactory degree of illumination with artificial light. Others thought it quite possible to get a satisfactory scheme of artificial lighting without excessive expense. The chief difficulty lies in arranging the lights so as to avoid sharp shadows; the lighting should be in great part direct, since it is difficult to get sufficient illumination by reflection from walls and ceiling alone. The Committee think that with proper artificial lighting the restrictions on close work may be relaxed, and that although in many of the rooms at present in use it may be difficult to secure the necessary type and arrangements of artificial lights, in the planning of new premises an effort should be made to secure adequate artificial lighting. The provision of special means of illuminating the blackboard is a small but important matter.

(2) *Wall Equipment.*

One of the great difficulties in equipping a room for the partially sighted lies in providing a sufficient amount of blackboard space without disfiguring the walls and lessening the amount of reflected light. Many rooms are at present surrounded with an expanse of unsightly fixed blackboard, and several of our witnesses spoke of its depressing effect. The suggestions made for remedying this condition included the ideas of light three-ply boards sliding back on runners, and cloth blackboards on the roller-blind principle. The former kind would undoubtedly provide the better writing surface. Another device used in some Scottish schools is a board of stiffened fabric that can be wound after the fashion of a roller-towel.

(3) *Writing Material.*

The younger children do most of their writing with chalk on boards surrounding the walls of the classroom; in order to keep the writing at arm's length, a line is sometimes chalked on the floor, inside which the children are not allowed to stand. So long as the amount of writing is small and there is no great need for permanent records of what they have written, this practice has only the drawbacks mentioned in the previous section of disfiguring the wall

space. As the children get older, writing is done at arm's length on paper attached by clips to their desks when turned to the upright position, or on rolls of paper of matt surface wound on spools. The writing instrument is either a thick black crayon or soft thick pencil; the latter seems preferable, since it gives a deeper black impression and better gradations in the thickness of the strokes. Many of the schools have, for cheapness and efficiency, taken to purchasing their paper in the form of unused ends of rolls of newspaper, which are easily procurable from the local newspaper printing works.

Pen and ink are seldom used because children tend to bend too closely over their work. But in this, as in reading, there are possibilities of profitable discrimination between those who may use pens and those who as a general rule should not. It is safe to say that after school life the means of writing now used in the schools will not be continued; and the question arises whether it is not better to teach children to use the ordinary writing materials with a proper regard for the safety of their eyes than to neglect these materials altogether. The Committee's opinion is on the side of permitting the use of pen and ink under the safeguards referred to below. At the present time, a good deal of experimental work is being done in ordinary schools in teaching bold lettering with a broad nib, and it might be worth while for those concerned with the education of the partially sighted to consider whether this particular technique could be adapted to the needs of some at least of these children. But no child should be allowed to use a pen unless in so doing he can easily maintain an upright posture, without stooping and peering, either when writing or reading what he has written. Work with the pen, even though it were taken only in the last few years of school life, might serve to show the children how they could avoid danger to their eyes in later life if they were called upon to use the ordinary means of writing.

(4) *Desks.*

The problem of providing suitable desks for the partially sighted is both important and difficult. The desks have to serve a variety of educational purposes, and in respect of each purpose they must conform to certain ophthalmological and postural requirements. When in use for reading the desk should support a book at the level of, and at a distance of about 14 inches from, the eyes. For writing lessons, except for the occasions on which the use of a pen is allowed, the writing surface must be tilted back a little from the vertical, so that the child, when sitting upright, can write at arm's length; if any continuous writing is to be done, there must be some device for keeping the writing at a height that never falls much below the level of the eyes. If writing with the pen is to be allowed, a desk-surface that slopes up a little from the horizontal is needed. For some forms of handwork a flat-topped individual desk is desirable, though it does not suffice for the larger kinds of

handwork, for which trestle tables or the like should be supplied. The desk seat should be suited to the stature of the child; in practice it has been found that chairs of various sizes are preferable to seats, whether fixed or adjustable, that are integral parts of the desks.

It is difficult to construct an inexpensive desk that fulfils all these conditions, and in fact none of the desks at present in use does so. The commonest is the Bishop Harman desk, which is convertible from a flat-topped table into a sloping blackboard. The blackboard is primarily intended to be used for writing in chalk, but for more permanent work paper can be attached to it by means of spring clips. The principle of convertibility that this desk embodies is generally admitted to be essential to the construction of a satisfactory desk, but the desk has certain defects, of which the chief is that the lower part of the blackboard surface cannot be used unless the child stoops, or as sometimes happens, kneels on the floor. Several of our teacher witnesses who use this desk described modifications that they had introduced to make it conform more closely with the requirements set out in the last paragraph. Among these modifications the more noteworthy are the following :—

(a) *For reading purposes.*—To hold books or maps a bar resting in slots in the desk framework is laid across the blackboard surface about half-way up.

(b) *For writing purposes.*—The main objects have been to increase the amount of writing surface available without a radical change of posture, and to obviate the use of the lower portion of the board.

(i) A large millboard or plywood blackboard is propped up on the flat surface of the desk so that the children can write compositions on it with chalk. This has been done chiefly in schools in which the use of pencil and paper has been discouraged. The Committee do not share the objections sometimes raised to the use of pencil and paper and therefore do not support the continuance of the use of boards for this purpose, but, if this upward extension is made to slip on to the desk in grooved runners screwed to the edges of the blackened surface instead of merely lying against it, it has been found to form a suitably firm backing for paper to be clipped to it. It can be slipped up or down as required. If this is done, even the lower edge of a large sheet of paper can be raised high enough to let the children write on it without stooping.

(ii) On the sloping board an attachment, consisting of two spools with a roll of paper and working vertically after the fashion of the film-winding apparatus of a camera, is fixed so that the child can write continuously, keeping

the level of his writing at the same height. The roll after removal from the spools forms a permanent record of the child's work.

Though much impressed with the ingenuity of the spool device, the Committee feel that because of the relative cheapness of the blackboard extension and because flat papers are more convenient for reference and are more easily stored than rolls, besides being a more normal form of writing material, the former modification of the Bishop Harman desk is to be preferred.

In some schools the Bishop Harman desk is not used at all, some form of sloping surface of green or black board being placed above a flat table or ordinary flat desk, and removed altogether when the flat surface is required for handwork. Some of these arrangements are in fact the most satisfactory both from the postural and the ophthalmic points of view, but they are in general clumsy and, unless in a very large room, their storage takes up space that can ill be spared. There is in use in at least one school for the partially sighted a desk that serves the triple purpose of work on the flat and in directions slightly inclined to the horizontal and the vertical, but it is a rather expensive type and is not constructed to allow of writing on paper when in the nearly vertical position. It does, however, serve to show that the practical difficulties of constructing a suitable desk are not insuperable.

It is, of course, difficult with any type of desk to prevent children from stooping and peering, and all the resources of the teacher's art must be directed to discouraging the practice. In some Scottish schools a guard is fitted to prevent the children from approaching the desk too closely, and in one English school the children have been supplied with a kind of braces, made of webbing and fixed to the back of the chair, to keep them sitting upright. These devices may be useful in helping some children to set up right habits in the early stages of training, and if all the resources of discipline and suasion have failed to eradicate faulty practices their use at a later stage may occasionally be justified.

(5) *Use of the Typewriter.*

In some elementary schools, as also in the London Secondary classes for partially sighted children, experiments have been made in the use of the typewriter for school purposes. The special value of the typewriter is that it enables the child to make a greater output of written work and facilitates the storing of the work and the teacher's task of correcting it. To prevent misuse of the eyes the paper that receives the typed impression is covered by a sheet of carbon paper, and the "touch" method is employed. This training may be useful to a few selected children as a preparation for writing in later life, but in present social conditions there are not many children who will have access to typewriters after they leave school. Besides this there is the danger that the

acquisition of any considerable skill in using a typewriter might be an inducement to some children to take up in later life the unsuitable occupation of a shorthand-typist. At present, therefore, we are unable to recommend any considerable extension of the use of the ordinary typewriter in the elementary school. Greater promise is perhaps to be found in the use of a typewriter, such as is now on the market, that produces type-script of a very large size which is easily legible by many children whose sight does not permit them to read ordinary type-script. This typewriter is widely used in the American schools for the partially sighted. As a means of producing supplementary reading matter or notes of a semi-permanent character for the use of selected pupils, and as giving at the same time the technique of typewriting, there is much to be said for providing such a typewriter where, on general grounds, the provision of a typewriter is thought desirable.

(6) *The Epidiascope.*

In certain schools the epidiascope has been used experimentally, and several of our members have seen an instrument in use with partially sighted children in a school where the Head Teacher was certain of its value. On the other hand, several of our teacher witnesses have said that it was not permitted in their schools, and there appears to be some doubt of its suitability as a teaching aid. Whatever criticisms can be brought against the epidiascope, we are satisfied that glare is not one of them, if the picture is projected on a white or cream painted wall or matt screen. There are certain children who, because of low visual acuity, cannot see the details projected, but the majority can see well enough to grasp more than the mere outline. Where a map, for example, is projected, only a few will see nothing but a blur, the remainder getting the outline, contour colouring and river lines. Few will be able to read the names, but this is not necessary, since the names printed on the wall maps in use in Elementary Schools are seldom visible to all members of the class. As we contemplate an extension of the provision of printed matter in the schools, we do not think it is necessary to recommend the use of the epidiascope for throwing it on the screen, but we consider the instrument of great value for showing pictures, maps, diagrams, etc. The cost may prevent its use in small segregated schools, but where an epidiascope forms part of the equipment of an Elementary School in which there is a non-segregated class for the partially sighted, we do not think that these children should be debarred on ophthalmological grounds from sharing its advantages with their normal fellows.

E.—Further Education.

The Committee's views on secondary education for partially sighted children are expressed in Chapter IV, Section D, and the same considerations apply to the question of their entry into

Selective Central and Technical Schools. In any area outside London the number of partially sighted children fit to profit by further education will be too small for the formation of special classes, and in any Secondary or Central School class there will be only isolated individual partially sighted children. The precautions to be taken in their interest will be the same in principle as those which are laid down in the preceding pages, but special consideration will have to be given to them in respect of homework.

F.—Vocational Training.*

The general trend of the recommendations of this report is to produce a closer assimilation of the education of the partially sighted to that of normal children, and this trend is adverse to the conditions under which vocational training can be introduced into the schools. While we wish to see emphasised those factors of a good general education which will compensate as far as may be for visual disabilities, we feel that specific vocational training is too dubious a matter in theory and too difficult in practice to warrant our support for introducing it into the elementary school course.

G.—The Qualification, Recruitment and Training of Teachers.

The special qualifications of teachers of the partially sighted are determined by the distinctive needs of the children. Like all handicapped children the partially sighted will have a harder fight in life than their more fortunate comrades, and they need teachers whose influence is so invigorating as to stimulate them to all the effort of which they are capable. But in some ways the children's efforts will be severely hampered, and of their unavoidable weaknesses the teachers must have a sympathetic understanding. The kind of sympathy needed is not merely a sentimental pity for human disabilities, for in that lies the danger that the teacher will be tempted to do for the children things that they should do for themselves; the understanding must be directed towards using the children's positive potentialities to make good as far as may be the failings due to defective vision; too great a concern with disabilities is a heavy clog on a teacher's activities. We cannot emphasise too strongly the need for those personal qualities in the teacher that make for zeal and independence in the pupils.

In addition to the general knowledge of the hygiene of the eye that all teachers should acquire in their course of training, teachers of the partially sighted need a simple working knowledge of the structure and functions of the eye and of its commoner defects and diseases. Such knowledge, if not very detailed, must be exact and based upon sound authority. Without this knowledge teachers will be unable to appreciate fully and follow out intelligently the instructions of the ophthalmologist in regard to particular cases,

* See also Chapter VII, Section J.

nor will they be able to observe and to bring to his notice the facts relevant to the progress of the children's defects which they should discover in their daily contacts with the children. In brief, effective co-operation and consultation between the ophthalmologist and teacher, upon which so much depends, demands that each shall know something of the other's problems. For his own part the teacher requires this knowledge in order to discriminate properly between the various educational capacities and limitations of the children and to adjust the tasks that he sets them to suit the particular conditions of their eyes.

The classroom régime requires, as we have previously noted,* that the teacher shall be a clear and effective speaker with wide interests in human affairs. In every school there should be some teacher who can conduct the physical training with the requisite energy and spirit, and one who can plan and supervise the craft-work; in the non-segregated school, of course, the general resources of the staff can be called upon for these purposes, but in the segregated school these requirements must be specially considered in making appointments. The use of specialised methods of teaching in reading and writing calls for some special knowledge, but perhaps not more than a teacher of ordinary adaptability who is skilled in elementary school methods can acquire after a short period of teaching practice with partially sighted children.

The teacher of the partially sighted requires, then, some strongly marked personal qualities, some not uncommon professional qualifications, and, in addition, the kind of knowledge of the eyes referred to in a previous paragraph and some knowledge of specialised teaching method. Previous successful experience of teaching ordinary children should be considered essential, but it should not have lasted so long as to endanger the elasticity of the teacher's mind or to have made the teacher a slave to traditional methods of class instruction.

It remains to consider whether these requirements call for a special course of training for entrants and, if so, whether means are available for providing it. The teachers who gave evidence differed as to the necessity for a preliminary course of training, but did not doubt its desirability if it could be provided. The chief difficulties in the way of arranging a course of preliminary training arise from the small number of recruits needed annually and the widely scattered distribution of the schools, but an increase in the provision for the partially sighted will diminish this difficulty. In the present circumstances the Committee feel that there is a greater promise of usefulness in providing occasional courses of instruction that can be attended by teachers already in the service of schools for the partially sighted as well as by intending entrants, and they wish to put forward for the consideration of the Board of

* See Section C (1) of this Chapter.

Education the possibility of conducting such a course at an early date and of repeating it at convenient intervals.

Meanwhile we think that new teacher entrants should receive the training that they need by serving for a probationary period as acting teachers in schools specially selected for their educational efficiency. The knowledge of ophthalmological problems that they need should be acquired under the guidance of the Head Teacher by contact with the children in the schools, and by the reading of a suitable textbook; and we would express the hope that the Local Authorities' ophthalmologists will contribute to this part of the training. For the more rapid spread of good educational practice we recommend that the interchange of visits between the staffs of different schools should be encouraged and that means should be sought to publish in bulletins or pamphlets accounts of successful ventures in the education of the partially sighted.

A further problem, and one that needs serious consideration by Local Authorities, is that of maintaining a constant infusion of fresh blood into the teaching staffs of these special schools. Although there are convincing examples of teachers who have kept throughout a long life of service in special schools the vigour and enthusiasm with which they started, there are many other teachers whose energies and interests have flagged. Work with handicapped children makes heavy demands on the teachers and these demands are more easily met in youth than in middle age. It is unfortunate that in many cases a step taken into the special schools is at present considered irtraceable, and we would commend as an example the Scottish practice, of which one of our witnesses spoke, of regarding a period of service in a school for the partially sighted as an additional qualification for promotion in the ordinary system of elementary schools.

CHAPTER VII.

EMPLOYMENT.

Partially sighted children, as we have emphasised throughout this report, are not members of a special class of blind persons for whose maintenance, occupation and employment specific arrangements are made. They have to find their place in the work-a-day world of seeing people. As candidates for employment, however, they are differentiated from other young people, first by any prohibition imposed on particular occupations, secondly by the degree of defective vision with which they are, or appear to be afflicted, and thirdly, by any particular incapacity such, for example, as inability to read in inkprint any matter essential or incidental to employment.

A.—Methods of Finding Work.

Partially sighted children may place themselves in the hands of their local Juvenile Employment Exchange or Bureau, or, like many other boys and girls who find work for themselves on leaving school, they may apply at the factory gate or office door, or be placed by a relation or friend who "says a word to the foreman" or "speaks for them to the boss." In placings affected unofficially a considerable degree of defect may be overlooked, and restrictions recommended by the school authorities may be completely ignored. Our evidence from Bradford for example is to the effect that many of the children from the special schools "enter the mills where work is trying to the eyes." Even where work is found by Juvenile Employment Exchanges or Bureaux working in close harmony with the schools, the volume and nature of the demand for juvenile labour at the moment of leaving school is likely to outweigh all other considerations. When the demand for school leavers exceeds the supply, children with defective eyesight will obtain jobs of some kind, and, despite all efforts to find suitable occupations for them, will tend to gravitate towards the best paid employment whether suitable or not. At the present time in most parts of the country, children of 14 are in great industrial demand, and partially sighted children are drawn into the labour market before they reach their sixteenth birthday, even though they are likely to find themselves unemployed at any age from 16 to 20. Moreover, until the gap in Unemployment Insurance is bridged by some such measure as that recommended by the Royal Commission on Unemployment Insurance*, there is no effective means of main-

* The Unemployment Bill, 1933, which is before the House of Commons at the date of issuing this report, proposes to implement the recommendation of the Royal Commission on Unemployment Insurance by making the minimum age for entry into Insurance the "age (not being less than 14 years) when a person attains the age at which under the law for the time being in force his parents cease to be under an obligation to cause him to receive efficient elementary instruction or to attend school." (Part 1, Section I (1) of the Bill).

taining contact between the official employment agency and the young persons who have left school until they come into insurance at the age of 16 plus. None the less, sympathetic handling by Employment Exchanges and Bureaux, working in conjunction with schools or special classes which have kept the object of employability closely in view, can do a great deal to direct children into suitable employment, thus saving them from hardship while providing industry with young employees suitable for particular kinds of work.

B.—Occupations and Supervision.

The general considerations affecting the employability of partially sighted children are set out in Chapter VI of this report (pages 76 and 77). It is pointed out there that most partially sighted children in their urban environment are unable to obtain open air employment, and are debarred by the state of their vision from occupations which call for close or continuous use of the eyes or involve constant muscular strain. It is suggested that they are likely to find their best conditions of employment in the distributive trades rather than in manufacturing, and generally in occupations which require social qualities rather than manual skill.

It has not been possible for us to make a comprehensive statistical inquiry into the employment actually entered upon and retained by the ex-pupils of special schools, but from a number of sources we have been able to form some general impressions on three points: the work obtained on leaving school; the amount of guidance and assistance given in finding first employment and securing subsequent advancement; and the extent to which eyesight is kept under supervision.

On the first point our evidence is fairly homogenous. There may be a bias towards openings of some particular kind in certain towns, but generally speaking the first jobs taken on leaving school are unskilled and of a somewhat unpromising nature. On the second and third points our evidence indicates a great variety of action and inaction. A summary of the evidence obtained from certain towns on these three questions will be found in Appendix G. Attention may here be called to the marked diversity in practice with regard to the actual age of leaving school, periodical re-examination of eyes, and provision of industrial after-care.

In Bradford, for example, children leave school at 14, "unless the defect is progressive, and unless there is a definite proposal to place the child in unsuitable work." In Liverpool they usually stay to 16 and leave earlier only with the approval of the Education Authority on the recommendation of the ophthalmic surgeon. In Barrow-in-Furness and Bristol children are free to leave at 14 without conditions. In Leeds and Birkenhead leaving before 16 is allowed only in special cases and with special safeguards.

In Bradford children starting work at 14 are subject to ophthalmological re-examination at six-monthly intervals up to 16 years of

age. In Liverpool, Sheffield, Barrow-in-Furness, Birmingham, Bristol and London no ophthalmic supervision is enforced.

In Liverpool the Juvenile Employment Bureau (which has officers specially detailed to find employment for scholars from special schools) keeps in close contact up to the age of 18, and not only advises on employment but on occasion urges attendance at a clinic or hospital for ophthalmological re-examination. In Sheffield and Barrow-in-Furness there is no After-Care Committee, but the teacher keeps in touch with old pupils. In Birkenhead the parent or employer of any child allowed to leave before 16 is required to submit a quarterly report on work and progress. In Leeds, After-Care Registers are kept at the schools and regular inquiries are made in one school up to the age of 16, in another for five years after leaving.

The above brief extracts reveal a lack of any common standard of after-care. In no town or area, so far as we have been able to ascertain, are all the children who are retained in school to 16 safeguarded from entering occupations detrimental to their sight and retained under ophthalmic and industrial supervision to the end of adolescence. The system of after-care in force at Bradford is reasonably complete: but it seems to end at 16, and to be designed primarily to protect in employment the sight of children who have tentatively been discharged from the special school. In certain other towns nothing apparently is done even to mitigate the results of allowing the special school children to leave at 14.

Analyses of Occupations.

The material given in Appendix G contains several statements and sample surveys of occupations entered. Attention may be called here to their salient points:—

Liverpool.—(a) Of 51 registered for employment, 17 were placed by the Bureau, 11 were placed otherwise, 4 were placed for training, 18 were unemployed and 1 has been lost sight of.

(b) Of 13 boys, 3 had entered the Workshop for the Blind.

Sheffield.—Of 41 first employments for boys, 2 were in Workshops for the Blind, 10 in the staple trade of Sheffield, cutlery and steel, 6 were vanboys and errand boys and 3 were hawking. Of 58 first employments for girls, 32 were in domestic service, 12 in home duties, and 5 were shop assistants.

London.—Of 76 boys and girls under supervision the largest single classes were Shop Assistants (9), Messengers (5) and Factory Work (5). Of 20 more recent placings the chief classifications were Woodwork (4), Nursemaid (4) and Messengers (3).

Generally it appears that the proportion of shop assistants among the ex-pupils of schools for partially sighted children is high, and that the lists otherwise are fairly typical of the general run of

unskilled light occupations. Few of the occupations can be regarded as skilled. French polishing certainly is and others such as umbrella making and wireless work might be. In the occupations followed by "decertified"* children woodwork bulks largely and it appears that the London After-Care Association has been able to obtain some openings with fair prospects in work of this kind. But it is to be borne in mind that a considerable number of light industries which have grown up in and around London in recent years may be described as "woodwork." They produce a wide range of commodities from packing cases to wireless cabinets and they may require very little skill.

The Position in London.

Before commenting further on the arrangements generally, some attention must be given to those made in London, because in the metropolis arrangements of a particular kind have been in force for a number of years for dealing with children from special schools. As long ago as 1926 the School Medical Officer published in his Annual Report a list of the most suitable occupations for myopes, grouping the suggested occupations in two grades, Grade A being mainly of the outdoor type, in which it is reasonable to expect an improvement in general health favourable to the eyes, and Grade B being indoor occupations which involve sitting and stooping to a limited extent. Grade A occupations for boys include nursery gardening, rent collecting, poultry farming, street trading, and work as insurance agents, travellers or canvassers. The recommended factory employments are wire-working, wrapping and packing in chemical, soap and candle factories, skin dressing and tanning, and French polishing. Group B occupations are for the most part typical light industries of the kind which have greatly increased in the London district in recent years. Of the occupations recommended for girls, domestic service, in carefully selected places and involving no sewing, is prominent. A limited number of factory employments, similar to those suggested for boys, appear in the list, and the occupations in "B" group are in general character similar to those recommended for boys. The School Medical Officer's report for 1929 states that of the children in attendance at the schools for partially sighted children, about one-third are non-myopes who would find satisfactory life occupation in gardening if they had a bent for that kind of work, and that there is no part of gardening from which they must be barred. The myopic children on the other hand would be benefited by outdoor life of any kind, but they must not be employed in occupations which would outweigh the advantages of outdoor life. Children with ten dioptries or more of myopia should be prohibited from gardening in any form except possibly light work in the potting shed.

* i.e., children who have attended schools for the blind but who have subsequently been found not to be blind for the purposes of the Blind Persons Act.

The London County Council in considering these recommendations had already before them the results of an inquiry made in 1924 which showed that of the 437 children who left schools for the partially sighted in London in the three previous years, 69 per cent. were known to be employed, and 15 per cent. could not be traced. The analysis of employment showed that the majority were engaged in unskilled trades, but the range of occupations was, on the whole, typical of the general distribution in London.

A Voluntary After-Care Association.

In London alone, so far as we have been able to ascertain, a Voluntary After-Care Association is used as the official agency for dealing with partially sighted children. The Association in question is the After-Care Association for Blind, Deaf and Crippled Children. It receives no financial assistance from the London County Council, but is paid a grant of £1,600 per annum by the Ministry of Labour. In principle this sum is to be used equally for all types of children referred to the Association. The whole cost of training fees, tools, and other assistance to individuals has to be raised from voluntary sources. Its responsibilities, however, are not quite as extensive as its title implies. Children who are eligible for industrial benefit under the Blind Persons Act do not come under its care at all. The only children referred to it from schools for the blind are those children who are "decertified" at or after the age of 14. About half the total leavers from schools for the partially sighted are referred to the Association by the London County Council, all of them being children suffering from high myopia.

On the other hand, all leavers from London County Council schools for the deaf and crippled are referred to the Association direct from the school. It would be only natural if in these circumstances the After-Care Association regarded their partially sighted protégés as less definitely their responsibility than deaf and crippled children. There is no doubt that an After-Care Association is needed for partially sighted children, but it is not so certain that the After-Care Association for Blind, Deaf and Crippled Children is the right one. It is found that parents object to their children being under the care of an Association in the title of which the word "blind" is included; and work-finders who have specialised in finding work for children whose education in schools for the deaf and the crippled has been definitely vocational find it difficult to keep in touch with possible openings in the limited number of trades recommended for high myopes.

In spite of these limitations the After-Care Association is doing valuable work, and it has in the last few years assumed responsibility for an increasing number of "decertified" children from schools for the blind. At the date of our inquiry (1933) the number of children under supervision was 76, comprising 56 ex-pupils of special schools for the partially sighted, all of them

high myopes, and 20 "decertified" children. Six of these were known to be out of work and 3 others were regarded as definitely unemployable; 5 had been lost sight of; 3 were in further training; 2 were doing house-work at home and 1 boy of unsatisfactory character had been committed to a Home Office school. The remaining 56 were in work. A list of the occupations followed by them will be found in Appendix G.

C.—Residential School Leavers.

We would have been glad to supplement our information by some facts on the industrial disposal of partially sighted children who had been educated at residential schools for the blind, but little information was available, and it appears that frequently such children, not being blind and returning home often to rural places, lose contact with their schools, and, as no particular agency is responsible for their after-care, cease to be anyone's particular concern. The evidence we were given from one school in East Anglia was that its partially sighted ex-pupils went into domestic service or for training if they were girls, and, if they were boys, became farm labourers, boot repairers or shop assistants.

D.—Juvenile Exchanges and Bureaux.

We have referred more than once in this chapter to Juvenile Employment Exchanges and Juvenile Employment Bureaux. The responsibility for the industrial placing and advising of juveniles has been given in some districts to the Ministry of Labour, and in others to the Local Education Authorities. Juvenile Employment Exchanges are Juvenile Departments of Employment Exchanges maintained by the Ministry of Labour, whereas Juvenile Employment Bureaux are *ad hoc* offices maintained by the Local Education Authorities, which, in this matter, are responsible to, and receive a grant from, the Ministry of Labour. The general policy is that the applicant for employment whose name is submitted to employers is the one who is industrially best fitted for the vacancy. The arrangement made by the Ministry of Labour with the Voluntary After-Care Association in London is a useful expedient by which the Exchanges can give special consideration to the young person who is handicapped by defective vision, without in any way abandoning the general policy of satisfying the employer. In areas outside London the partially sighted applicant for work officially gets no special consideration, though in many cases the officers of the Exchange or the Bureau personally take great pains to find an employer who is willing to accept a handicapped young employee.

E.—Unemployment.

While our inquiries were in progress a report was published on one of the Sample Inquiries into juvenile employment and unemployment undertaken from time to time by the Ministry of Labour.

Some prominence was given in this report to the finding that an unduly high percentage of young persons who had been a long time out of work were suffering from defective sight. The fact as stated is *primâ facie* probable, for in times of widespread unemployment preference will usually be given by employers to the healthiest and strongest applicants for work. But the finding referred to was, we found on inquiry, based on the individual opinions of the Employment Exchange officers who made the investigations covered by the report and cannot therefore be tested by ophthalmic standards.

F.—Summary of the Present Position.

We have been careful in setting out facts in this chapter not to generalize from the limited data available. It seems fairly clear, however, that partially sighted children on leaving school are, as a rule, able to obtain unskilled work of a light character with poor prospects. It is satisfactory in a sense that they are able to obtain work on leaving school. It is disquieting that they are more likely than other young persons to fall into the ranks of the unemployed, becoming a section of the unemployed with a particular handicap. Young employees with good personal qualities can sometimes work their way into permanent posts, even from first employments which are intrinsically of a blind-alley character. The moral of the industrial situation is that without all-round ability and strong personal qualities, partially sighted children are likely to be among the first to suffer when young labour is being turned from employment.

G.—Industrial Supervision.

We have already commented on the lack in a number of districts of continued supervision of young persons from special schools for the partially sighted. The arrangement in force in Liverpool is to be commended. Our evidence has made it clear that in many of the schools the teachers themselves do an immense amount of work out of school hours in making contact with employers and securing posts for their children when they leave. In places where the official agency for placing and advising juveniles in work is unable to give special attention to handicapped children, the effort made by the teachers for their children is of incalculable benefit. On the other hand, placing in employment is not properly the function of a teacher and, seeing that Juvenile Employment Bureaux are able to place school leavers in occupations which are *primâ facie* suitable, we have no doubt that in the long run placing is better done by the agency which exists for the purpose than by the effort of teachers, however devoted they are.

H.—Ophthalmic Supervision.

In Chapter III of this Report we have emphasized the importance of ophthalmic supervision of myopes from adolescence, and earlier in this chapter we have shown that ophthalmic supervision of partially sighted young persons is generally non-existent after they

leave school. Any system of after-care for partially sighted children, if it is to be effective, must include ophthalmic supervision, i.e., periodical re-examination of the eyes and consequent treatment, at least up to the age of 18.

I.—The Age of Leaving School.

We have already commented also on the present diversity of practice on the question of retaining partially sighted children in special schools up to the age of 16. Most Authorities permit the children to leave at any age after the general school leaving age, i.e., 14 plus, but on more or less stringent conditions. It is unfortunately a fact that jobs are harder to obtain at 16 than at 14. If all children were educated till they were 16 there is no doubt that employers would obtain children of more highly developed intelligence for their work, but so long as the general school leaving age is 14, children who are retained at school to any later age are necessarily handicapped in competing for employment. Children with partial sight are already handicapped industrially and it is possible that some of them may find at 14 jobs which will lead to life occupations. We are not convinced that there is a strong case for maintaining the present later school age in special schools for partially sighted children, and we certainly do not feel able to recommend that any action should be taken to enforce attendance up to 16 in areas where leaving after the age of 14 is permitted under suitable conditions.

These conditions should, in our view, be :—

- (1) That suitable work is available.
- (2) That the local employment agency, whether Bureau or Exchange, shall keep in touch with the young person up to the age of 18, and
- (3) That provision is made for the ophthalmic examination of the young person at intervals of, say, 6 months up to the age of 18.

J.—Vocational Training.

We have given very careful consideration to the suggestion which has been mooted in various quarters from time to time that partially sighted children, in common with certain other classes of handicapped children, should receive a vocational education to fit them for employment in later life in specialized occupations or possibly in specialized workshops. Logical as this proposal may seem at first sight, we have most reluctantly come to the conclusion that it is impracticable. The range of trades for which a crippled boy, for example, may be trained, is narrow and many of them require perfect vision. The training of blind children for trades is of practical benefit only in so far as provision is made for the carrying on of the trades in question in Workshops for the Blind or under Home Workers schemes. A similar sequence of training

establishment and workshop or home workers scheme for the partially sighted would aggravate the already serious problem which Workshops for the Blind have to meet in disposing of their products. There is not, so far as we can see, any solution to the difficulty along these lines.

Particularly difficult cases arise from time to time, where persons who are not blind within the meaning of the Blind Persons Act are unable, after every effort has been made, to find a means of livelihood. A Workshop would be of immeasurable value to such persons who, in fact, fall industrially between the two stools of sight and blindness. A very limited number of them might find employment in Workshops for the Blind, not as blind persons, but as ordinary employees, using such sight as they possess, but there are few such posts open. It is possible that the hardest of such cases might be met by giving industrial training in some handicraft which could be carried on at home. Girls and women in such cases might find a satisfactory opening in domestic service. But on the whole, vocational training does not offer an outlet for the persons whose needs we are considering in this report. There is no practical alternative to accepting the principle that the partially sighted members of the community must play their part and take their chance in the ordinary work-a-day world, and to recognise consequently that their education must as far as possible give them an equal chance with other people.

K.—Special Schools and Normal Living.

Recognising then the handicap to which their pupils will later be subject, the schools for partially sighted children must aim at avoiding the imposition of a further handicap resulting from any unavoidable limitations in their education. We have discussed in Chapter VI the restrictions in the educational curriculum of these schools which we consider to have been carried too far. These restrictions cannot but impose a handicap on a child when he enters the industrial world. Moreover lethargy of movement and slackness of poise, which unavoidably result from impeding physical activity by an exaggerated régime of "safety first," will also later on be a handicap both socially and industrially. It should not be impossible to impart a vocational bias of a helpful kind, and in any case some of the school-time which in normal schools would be given to reading might be used for developing interests which will be of permanent value to the children in later life, whether they are employed or unemployed. A closer study of the occupations suitable for partially sighted children might yield results of value. Some myopes will, despite their handicap, take advantage of technical training provided by technical schools, and by ability and determination will force their way into skilled occupations. Others will take advantage of other means of education within their reach and will make places for themselves in some profession, but these

are the exceptional children who always elude generalisation. The special schools have to do everything in their power for the general mass of the children committed to their care. The conclusions already reached on purely educational grounds with respect to the curriculum and character of special schools are emphasized by the examination of the problem from the end of employment. The schools are not schools for training a special class of adults. They are schools for bringing a special class of children as fully as possible into the stream of normal life, and this has to be borne in mind in every detail of their work.

CHAPTER VIII.

SUMMARY OF PRINCIPAL CONCLUSIONS AND RECOMMENDATIONS.**A.—Definitions and Certification.**

1. Children certifiable as "blind" under the Education Act fall into three categories :—

(a) Those who, having no perception of light or having extremely defective vision, cannot be taught by methods involving the use of sight.

(b) Those who, on account of defective vision, cannot follow the ordinary school curriculum but can see well enough to be taught by special methods involving the use of sight.

(c) Those who are suffering from conditions such as myopia which may be aggravated by following the ordinary school curriculum. (Chapter I, page 7.)

2. Categories (b) and (c) above are commonly known as the "partially blind." This is a misnomer; the term "partially sighted" is more appropriate, for the children in these categories are part of the sighted community. (Chapter I, pages 7-9.)

3. We recommend that the Board of Education should consider the possibility of adopting the Scottish procedure of certifying partially sighted children as "physically defective." (Chapter I, page 9.)

B.—Medical.

The Selection of Children for Admission to Special Schools for the Partially Sighted.

4. The selection should be made by an ophthalmic surgeon. (Chapter II, pages 20 and 26.)

Standards for selection of myopes.

5. No hard and fast rules can be laid down, but it is desirable to formulate general principles in order to reduce divergences in practice. These principles are :—

I. If the eyes show fundus changes indicative of a serious condition of myopia the child should always be admitted to a special school.

II. In the absence of signs of such fundus changes the child should usually be admitted to a special school if :—

(a) after repeated examinations it is found that the myopia has been increasing steadily at the rate of more than 1 dioptré per annum ;

(b) after a period of slow rate of increase or apparent arrest it is found that there is a sudden rise in the rate of progress to more than 1 dioptré per annum.

III. The actual amount of myopia should not be the sole factor in determining whether a child should be sent to a special school.

IV. The age of the child must be taken into account. The younger the child the more serious are factors such as degree of myopia present and the rate of progress of that myopia. In doubtful cases the existence of a history of myopia in the family may be a deciding factor.

V. Children with a visual acuity after correction of 6/24 or worse should be admitted to a special school, though the majority of these will probably fall within category I above. (Chapter II, page 23.)

Standards for selection of Non-Myopes (except those referred to in 8. below).

6. Children with a visual acuity after correction of 6/24 or worse should be admitted to a special school. (Chapter II, page 24.)

Incidence of Partially Sighted Children.

7. We estimate that, on the basis of the above standards, the incidence of partially sighted children in England and Wales is not less than 1 per 1,000 of children on the Public Elementary School registers, representing a total number of approximately 6,000. (Chapter II, page 31.)

Children suffering from acute or sub-acute inflammation of the eyes.

8. These children should be sent to special hospital schools, and not to special schools for the partially sighted. (Chapter II, page 24, and Chapter IV, pages 59-61.)

Frequency of ophthalmic examinations.

9. Partially sighted children should be examined by the ophthalmic surgeon at least once every 6 months. (Chapter II, page 20, and Chapter III, page 37.)

Transfers from Special to Ordinary Schools.

10. More attention should be given to the possibility of transferring children back from the special school to the ordinary elementary school. (Chapter II, page 32.)

Influence of Special School upon progress of Myopia.

11. The régime of the school for the partially sighted has some influence in decreasing or arresting the progress of myopia, but this decrease or arrest is not always permanent. (Chapter II, page 19.)

Co-ordination between Ophthalmic and Educational treatment.

12. Close co-operation is essential between the ophthalmic surgeon, the School Medical Officer and the teachers in schools

which contain partially sighted children. (Chapter III, page 37, and Chapter IV, page 53.)

The need for another Special Hospital School for the treatment of certain eye diseases.

13. We recommend that the Board of Education should consider whether an institution similar to the White Oak School at Swanley is required in the North of England for the treatment of chronic infectious diseases of the eye. (Chapter IV, page 61.)

C.—Administrative and Educational.

“ Non-Segregation.”

14. Partially sighted children should, when possible, be educated in classes forming an integral part of ordinary elementary schools. (Chapter V, page 73.)

Education of Myopes and Non-Myopes.

15. The educational treatment of myopes and non-myopes should be differentiated. (Chapter VI, pages 78-80.)

Blind Schools.

16. Partially sighted children should not, as a general rule, be sent to schools for the blind. An exception to this rule may be justifiable if it is certain or highly probable that the child will be certifiable under the Blind Persons Act by the age of 16. (Chapter IV, pages 49-51.)

17. We hope that the Board of Education will take immediate steps to require that schools for the blind should admit or retain partially sighted children only if special provision is made for their education by sighted methods. (Chapter IV, page 52.)

18. We recommend that the Board of Education should consider the possibility of bringing about a reorganisation of the residential blind schools so as to set apart some for partially sighted children only. (Chapter IV, page 51.)

Open Air Schools.

19. The open air school should, in general, be used for partially sighted children for limited periods only. (Chapter IV, page 59.)

Reading and the Provision of Printed Books.

20. Children with a moderate degree of myopia and no serious fundus changes should be allowed to read easily legible print of 18 point at a distance of about 14 inches provided the reading is not carried on for too long a time. (Chapter VI, pages 80-83.)

21. Non-myopes should be allowed to read any print which they can see without difficulty. (Chapter VI, page 79.)

22. A Committee containing representatives of publishing firms might be set up to select a list of books suitable for use by partially sighted children. (Chapter VI, page 84.)

Speech Training.

23. Speech training is a specially important subject for partially sighted children. (Chapter VI, pages 96-98.)

Work under Artificial Light.

24. With proper artificial lighting, the restrictions on close work may be relaxed. (Chapter VI, page 106.)

Physical Training.

25. A very restricted physical training syllabus need only be followed by myopes with more than, say, 10 dioptries, or those with serious fundus changes. Other myopic children can use a much less restricted syllabus and the exercises should be carried out with full vigour. Non-myopic children can use the full syllabus freely. (Chapter VI, page 91.)

Secondary Education.

26. If a partially sighted child has gained a scholarship to a Secondary School he should not be debarred from taking it up except after very careful consideration and consultation with his parents. (Chapter IV, pages 56-57.)

Teachers' Courses.

27. We recommend that the Board of Education should consider the possibility of establishing short courses for teachers in schools for partially sighted children, and for intending entrants. (Chapter VI, pages 112-113.)

Parents' Co-operation.

28. The co-operation of parents is necessary in order to preserve the benefits of the special school. (Chapter III, pages 40-42.)

D.—After-Care and Employment.*Ophthalmic After-Care.*

29. There is need for a scheme to secure continuous ophthalmic supervision of partially sighted children after leaving school. (Chapter III, page 44.)

Leaving Age of Children attending Schools for the Partially Sighted.

30. We are unable to recommend that any action should be taken to enforce the attendance of children over the age of 14 in schools for the partially sighted, provided the following conditions are fulfilled :—

(1) That suitable work is available ;

(2) That the local employment agency, whether Bureau or Exchange, shall keep in touch with the young person up to the age of 18 ; and

(3) That provision is made for the ophthalmic examination of the young person at intervals of, say, 6 months up to the age of 18. (Chapter VII, page 121.)

Vocational Training.

31. It is impracticable to establish courses of vocational training for partially sighted children. (Chapter VII, page 121.)

In concluding this Report we would express our warmest thanks to all those mentioned in Appendix A for their cordial co-operation in the Committee's inquiries. We were particularly glad to receive the evidence of Mr. N. Bishop Harman in view of his pioneer work on behalf of partially sighted children, and the evidence of the late Mr. J. Herbert Fisher, Sir John Parsons, and the late Mr. Treacher Collins, which was of great value to the work of the Committee. We should like to make special mention, too, of the investigations carried out on behalf of the Committee by Dr. D. M. Livingstone, Dr. W. E. Livsey, H.M.I. Mr. J. Lumsden, Dr. L. A. Williams and Dr. G. G. Wray. We are also indebted to The Times Publishing Company and Mr. Stanley Morison, who kindly assisted the Committee in connection with typographical problems.

Finally, we wish to place on record our appreciation of the valuable services of Dr. Underwood, our Secretary. His wide knowledge of the subject, his keen interest in all its aspects and his skilful handling of the medical and administrative problems involved in it have contributed in large measure to the preparation of this Report, for the drafting of which he has been in the main responsible. His labours were materially lightened by the ability and experience of Mr. E. R. W. Sage, his clerical assistant.

RALPH H. CROWLEY (*Chairman*).
 GRACE CRACKNALL.
 W. MCG. EAGAR.
 JESSIE I. FALCONER.
 J. FERGUSON.
 PERCY FLEMMING.
 P. LAVENDER.
 F. R. LOVETT.
 C. SHAW.
 E. L. TURNBULL.
 J. E. UNDERWOOD (*Secretary*).

APPENDIX A.

1. *List of Oral Witnesses.*

C. H. Anderson, Esq., Psychologist to the Education of the Blind Committee, National Institute for the Blind.

Captain Baker, Director of the Canadian National Institute for the Blind.

N. Bishop Harman, Esq., F.R.C.S., Ophthalmic Surgeon to the London County Council; Consulting Ophthalmic Surgeon, West London Hospital, etc.

F. W. Boddy, Esq., Head Teacher of the Daisy Hill School for Partially Sighted Children, Bradford.

J. D. Magor Cardell, Esq., F.R.C.S., Ophthalmic Surgeon to the Leyton Education Committee; Assistant Surgeon, Central London Ophthalmic Hospital, etc.

The late E. Treacher Collins, Esq., F.R.C.S.

Mrs. C. E. Crozier, Head Teacher of the Maud Maxfield School for Partially Sighted Children, Sheffield.

P. H. Dobson, Esq., Head Teacher of the Barnsbury Park School for Partially Sighted Children, London.

The late Alfred Eichholz, Esq., C.B.E., M.D., formerly Chief Medical Inspector, Board of Education.

Edward Evans, Esq., Superintendent of the East Anglian Joint Councils' School for Blind and Deaf Children, Gorleston.

The late J. Herbert Fisher, Esq., F.R.C.S.

Colonel R. Forbes, D.S.O., M.C., Inspector of Special Schools, Scottish Education Department.

R. R. Garden, Esq., M.B., D.O.M.S., Ophthalmic Surgeon to the Bristol Education Committee and the Westbury-on-Trym School of Industry for the Blind; Assistant Surgeon, Bristol Eye Hospital.

Captain F. H. Grenfell, D.S.O., Staff Inspector of Physical Training, Board of Education.

Robert B. Irwin, Esq., Executive Director, American Foundation for the Blind.

James Kerr, Esq., M.D., formerly School Medical Officer for London; author of "School Vision and the Myopic Scholar," etc.

W. E. Livsey, Esq., M.D., Ophthalmic Surgeon to the Liverpool Education Committee; Assistant Surgeon, Liverpool Eye and Ear Infirmary, etc.

Mrs. D. S. Mortelman, a representative of the Association of Teachers in Schools for the Partially Blind.

Sir John Parsons, C.B.E., F.R.S., D.Sc., F.R.C.S., Ophthalmic Surgeon, University College Hospital, etc.

F. W. Smith, Esq., Head Teacher of the Birchfield Road School, Liverpool (including Defective Vision Classes).

L. A. Williams, Esq., M.D., Chief Assistant School Medical Officer to the Bradford Education Committee.

Miss P. Winder, Secretary of the London After-Care Association for Blind, Deaf and Crippled Children.

2. The following assisted in carrying out investigations, or submitted memoranda.

Mrs. G. E. Alexander, The Times Publishing Company.

H. W. Archer-Hall, Esq., M.R.C.S., L.R.C.P., D.O., Ophthalmic Surgeon to the Birmingham Education Committee.

G. A. Auden, Esq., M.D., School Medical Officer for Birmingham.

W. Spencer Badger, Esq., M.B., formerly School Medical Officer for Wolverhampton.

J. S. Boden, Esq., M.B., Ophthalmic Surgeon to the Finchley, Hornsey and Wood Green Education Committees.

J. J. Butterworth, Esq., M.D., School Medical Officer for Lancashire.

T. E. A. Carr, Esq., M.B., Ophthalmic Surgeon to the Derbyshire Education Committee.

Lewis H. Carris, Esq., Managing Director, American National Society for the Prevention of Blindness.

Miss Helen J. Coffin, Supervisor of Braille and Sight-Saving Classes, Board of Education, Cleveland, Ohio, U.S.A.

J. A. M. Clark, Esq., M.D., School Medical Officer for Walsall.

M. Furnémont, Musée Scolaire National, Brussels.

N. Gebbie, Esq., M.D., School Medical Officer for Kingston-upon-Hull.

Mrs. W. Hathaway, Associate Director, American National Society for the Prevention of Blindness.

P. J. Hay, Esq., M.D., Ophthalmic Surgeon to the Sheffield Education Committee.

Henry Herd, Esq., M.B., School Medical Officer for Manchester.

Herr Dr. F. Hilker, Zentralinstitut für Erziehung und Unterricht, Berlin.

P. D. Innes, Esq., D.Sc., Director of Education for Birmingham.

M. Lebrun, Centre National de Documentation Pédagogique, Paris.

D. M. Livingstone, Esq., M.D., Chief Assistant School Medical Officer to the Surrey Education Committee.

M. Lonnoy, Directeur de l'Institut provincial d'Aveugles, Berchem-Sainte-Agathe, Belgium.

James Lumsden, Esq., M.A., H.M. Inspector of Special Schools, Board of Education.

Miss E. M. McVail, M.D., Divisional Medical Officer, London County Council.

Stanley Morison, Esq., The Times Publishing Company.

A. T. Paterson, Esq., F.R.C.S., Ophthalmic Surgeon to the Durham County and other Education Committees.

M. Rosset, Centre National de Documentation Pedagogique, Paris.

M. Rouvroy, Directeur de l'Etablissement special de l'Etat, Moll (Anvers), Belgium.

W. G. Savage, Esq., M.D., School Medical Officer for Somerset.

S. Starling, Esq., Superintendent, The Incorporated Association for Promoting the General Welfare of the Blind; formerly Superintendent, Birmingham Royal Institution for the Blind.

G. E. St. Clair Stockwell, Esq., M.B., School Medical Officer for Leeds.

Miss Edith W. Taylor, Research Agent, Board of Education, Cleveland, Ohio, U.S.A.

Miss M. G. Thomas, Information Officer, National Institute for the Blind.

F. L. Tribe, Esq., C.B.E., Ministry of Labour.

J. Williamson, Esq., M.B., Ophthalmic Surgeon to the Staffordshire Education Committee.

G. G. Wray, Esq., M.D., Assistant School Medical Officer, Lancashire Education Committee.

J. Yule, Esq., M.B., School Medical Officer for West Bromwich.

3. Many other Directors of Education, School Medical Officers, Ophthalmic Surgeons and Head Teachers of Schools for the Blind and the Partially Sighted assisted the Committee by answering questionnaires or in other ways.

APPENDIX B.

List of Special Schools in England and Wales which admit Partially Sighted Children.(a) *Day Special Schools for Partially Sighted Children.*

(NOTE.—These are all provided by Local Education Authorities.)

<i>Name of School.</i>	<i>Recogd. Accom.</i>
<i>England (except London).</i>	
Barrow-in-Furness, Thwaite Street	20
Birkenhead, Hemingford Street	40
Birmingham, Moseley Road	40
Birmingham, Whitehead Road Temporary	65
Blackburn, Roe Lee Park	20
Bradford, Daisy Hill	178
Bristol, Moorfields	75
Colchester, Wilson Marriage	22
Croydon, St. Luke's	20
East Ham, Monega Road	20
Edmonton, Montague Road	20
Essex, Grays Thurrock, Quarry Hill	20
Kingston-upon-Hull, Lambert Street	20
Kingston-upon-Hull, Osborne Street	20
Leeds, Roundhay Road	70
Liverpool, Birchfield Road	40
Liverpool, Christchurch	50
Liverpool, St. James's	25
Liverpool, Underlea	25
Newcastle-on-Tyne, Pendower Hall	45
Salford, South Bank	60
Sheffield, East Hill, The Maud Maxfield	120
South Shields, Cleadon Park	75
Sunderland, Tatham Street	50
Wood Green, Lordship Lane	50
York, Fulford Road	20
Total . .	1,210

London.

Bethnal Green, Daniel Street	45
Camberwell, Dulwich, Goodrich Road	70
Deptford, Tressillian Road	100
Fulham, Kingwood Road	75
Hackney, Berkshire Road	45
Islington, Barnsbury Park	100
Lambeth, Brixton, Sussex Road	70
Paddington, Amberley Road	45
Southwark, Walworth, Sayer Street	70
Stepney, Dempsey Street	125
Wandsworth, Clapham, Stonhouse Street	75
	<hr/>
Total ...	820
	<hr/>
Grand Total ...	2,030
	<hr/>

(b) *The following Schools for the Blind admit Partially Sighted Children in varying proportions.*

England.

Birmingham, Royal Institution for the Blind. (Day and Res.)
Bolton, Thomasson Memorial Blind (Council) School. (Day and Res.)
Brighton, Barclay Home and School for the Blind. (Res.)
Brighton, School for Blind Boys. (Res.)
Bristol, Royal School of Industry for the Blind. (Res.)
Burnley, Tarleton House Blind (Council) School. (Day.)
Exeter, West of England Institution for the Blind. (Res.)
Great Yarmouth, East Anglian Joint Councils' School for the Blind. (Res.)
Leeds, Blenheim Blind School. (Day and Res.)
Leicester, Stoneygate Road Blind (Council) School. (Day.)
Liverpool, Catholic Blind Asylum. (Res.)
Liverpool, School for the Indigent Blind. (Day and Res.)
London, East London Home for the Blind. (Res.)
London, Swiss Cottage Blind School. (Day and Res.)

Newcastle-upon-Tyne, Benwell, Royal Victoria School for the Blind. (Res.)

Nottingham, Forest Road Blind (Council) School. (Day.)

Oldham, Gower Street Blind (Council) School. (Day.)

Portsmouth, Francis Avenue Blind (Council) School. (Day.)

Preston, Industrial Institute for the Blind. (Res.)

Sheffield, Royal Institution for the Blind. (Res.)

Stoke-on-Trent, North Staffordshire Joint Councils' School for the Blind. (Res.)

Stretford, Henshaw's Institution for the Blind. (Res.)

Walthamstow, Wood Street Blind (Council) School. (Day.)

Wales.

Cardiff, Cathedral Road Blind (Council) School. (Day.)

Flint, Rhyl, North Wales Blind School. (Res.)

Glamorgan, Bridgend Blind (Council) School. (Res.)

APPENDIX C.

Some Investigations into Myopia.**(1) RATE OF PROGRESS OF MYOPIA IN SPECIAL SCHOOL CHILDREN
AND ORDINARY SCHOOL CHILDREN.**

Reference has been made in Chapter II to investigations on the rate of increase of myopia in children who have been educated in special schools and that in children who have been educated in ordinary elementary schools. The estimate of the rate of increase in myopia per annum in each group of children has been based on the study of a large number of children composing each group. There is no certainty, however, that the children composing each group were strictly comparable as regards age, sex, and degree of myopia.

For a strict comparison of the behaviour of myopia in children who have been educated in the special schools and that in children educated in the ordinary schools, two groups composed of an equal number of boys and girls of approximately the same age and of approximately the same degree of myopia and astigmatism should be investigated. The following is an attempt to make such an investigation.

For this purpose examination was made of the ophthalmic records of certain children who had attended the Daisy Hill Special School for Myopes (Bradford) and the Moorfields Special School for the Partially Blind (Bristol); similarly, examination was made of a large number of records of myopes who had attended ordinary elementary schools in areas which had no special school for the partially sighted. The special school children were as far as possible "paired" against the ordinary school children. Each "pair" consisted of two children of the same sex, of approximately the same age (the difference being not greater than two years) and of approximately the same degree of simple myopia and astigmatism (the difference not being greater than 1·5 dioptries); one member of the "pair" had been educated in a special school, the other in an ordinary school. The ophthalmic records of each member of the "pair" covered approximately the same length of time.

The estimate of increase in myopia of each case was made only on records which gave the actual refraction at each examination. The method of recording changes in myopia and astigmatism was as follows. A case of simple myopia has at the first examination, say, 4 dioptries; this after four years has increased to, say, 6 dioptries; the total increase was recorded as 2 dioptries and the average rate of increase per annum as $\frac{2}{4}$ or 0·5 dioptre. A case of myopic

astigmatism has, say, principal axes - 2 and - 4. This was recorded as having 2 dioptres of simple myopia with 2 dioptres of astigmatism; suppose these axes at the end of two years were - 4 and - 4 dioptres; this was recorded as having 4 dioptres of simple myopia or an increase of 2 dioptres of simple myopia with a decrease of 2 dioptres of astigmatism; at the end of another two years suppose the axes were - 4 and - 8 dioptres; this change would represent a total increase of 2 dioptres of simple myopia and 2 of astigmatism, or an average annual rate of increase of 0.5 dioptre of simple myopia and 0.5 dioptre of myopic astigmatism. In determining the rate of increase of simple myopia and myopic astigmatism of each case the total change in simple myopia and myopic astigmatism of both eyes were added together, divided by two and the result divided by the number of years during which the change had taken place. It is realised that this method of estimating and recording the change in myopia is an arbitrary one, but as the figures are used only for comparative purposes the fallacies inherent in it do not vitiate the conclusions drawn.

Seventy-nine myopes who had been in special schools were "paired" with myopes who had attended ordinary elementary schools. 37 of the "pairs" were boys; 42 were girls. The age range of the "pairs" were as follows:—

Over 5 years and under 8	...	...	...	...	28
Over 8 years and under 11	...	...	...	...	31
11 and over	...	...	...	...	20

The distribution of the "pairs" according to the amount of myopia* found at the first examination (neglecting the amount of astigmatism) was as follows:—

5 dioptres and under	...	...	...	...	40
Between 5 dioptres and 10 dioptres	...	...	...	...	32
Over 10 dioptres	...	...	...	...	7

The distribution of the "pairs" according to the period on which the calculation of the average annual rate of increase was based was as follows:—

<i>Period of Observation in years.</i>	<i>No. of "pairs".</i>
5	13
4	21
3	23
2	12
1	10

* The grouping of cases in which the refraction in the two eyes was unequal was determined by taking the higher amount of simple myopia.

The distribution of the cases (not "pairs") according to the average rate of increase in myopia per eye per annum is given in the following table:—

TABLE I.

<i>Average increase in Simple Myopia per eye per annum.</i>	<i>Special School Children</i>	<i>Ordinary School Children.</i>
0 dioptré	17	13
0.01—0.25 dioptrés ...	18	15
0.26—0.5 „ ...	19	24
0.51—0.75 „ ...	13	11
0.76—1.0 „ ...	6	9
1.01—1.5 „ ...	6	7
More than 1.5 „ ...	0	0

The average rate of increase of simple myopia
per eye per annum of special school children = 0.4 dioptré.

The average rate of increase of simple myopia
per eye per annum of ordinary school
children = 0.48 dioptré.

We give next a table (Table II) showing the distribution of the "pairs" according to the difference between the rate of increase in simple myopia per eye per annum of each individual member of the "pair." Part (1) of the Table shows the grouping of "pairs" in which the rate of increase in the special school child is greater than that in the corresponding ordinary school child. Part (2) of the Table shows the grouping of the "pairs" in which the rate of increase in the ordinary school child was greater than, or equal to, that in the corresponding special school child.

TABLE II.

*Difference between rate of increase in simple
myopia per eye per annum in members
of each pair.*

*Number of
"pairs."*

*Part (1).**Dioptrés.*

0.01 to 0.25	...	...	...	...	...	...	10
0.26 to 0.5	...	...	...	...	...	...	10
0.51 to 0.75	...	...	...	...	...	...	8
0.76 to 1.0	...	...	...	...	...	...	1
More than 1.0	...	...	...	...	...	...	1

*Part (2).**Dioptrés.*

0	...	...	...	...	...	...	6
0.01 to 0.25	...	...	...	...	...	...	18
0.26 to 0.5	...	...	...	...	...	...	13
0.51 to 0.75	...	...	...	...	...	...	5
0.76 to 1.0	...	...	...	...	...	...	6
More than 1.0	...	...	...	...	...	...	1

We must now consider the behaviour of the seventy-nine "pairs" with regard to change in myopic astigmatism.

Reference to Table II shows that in thirty "pairs" the rate of increase in myopia was greater in the special school child than in the ordinary school child. In fifteen of these, however, the rate of increase in astigmatism was greater in the ordinary school child than in the special school child. In five "pairs" there was no difference in the rate of change of astigmatism. In ten out of the thirty "pairs" the rate of increase in astigmatism was greater in the special school child than in the corresponding ordinary school child.

In the six "pairs" recorded in Table II as having no difference in the rate of change of simple myopia the changes in astigmatism were as follows. In one "pair" the ordinary school child showed a greater rate of increase in astigmatism than did the corresponding special school child; in three "pairs" the special school child showed a greater rate of increase in astigmatism than did the ordinary school child; in two "pairs" the rate of change of myopic astigmatism was equal in both members.

Table II shows that in forty-three "pairs" the rate of increase in simple myopia was greater in the ordinary school child than in the corresponding special school child. In seventeen of these forty-three "pairs" the rate of increase in astigmatism was also greater in the ordinary school child than in the corresponding special school child. In the same number of "pairs," however, namely, seventeen, the rate of increase in astigmatism was greater in the special school child than in the corresponding ordinary school child. In nine "pairs" the rate of change in astigmatism was the same in both members.

The distribution of the "pairs" in accordance with the differences in the rate of change of astigmatism between corresponding members is given in Table III. Part (1) of the Table shows the grouping of "pairs" in which the rate of change in astigmatism is greater in the special school child. Part (2) of the Table shows the grouping of "pairs" in which the rate of change in astigmatism is greater in the ordinary school child than in the special school child.

TABLE III.

<i>Difference between rate of increase in astigmatism per eye per annum in members of each pair.</i>							<i>Number of "pairs."</i>
<i>Part (1).</i>							
<i>Dioptries.</i>							
0.01 to 0.25	...	...	...	...	...	...	20
0.26 to 0.5	...	...	...	...	...	...	7
0.51 to 0.75	...	...	...	...	...	...	2
0.76 to 1.0	...	...	...	...	...	...	0
More than 1.0	...	...	...	...	...	...	1

*Part (2).**Dioptries.*

0	14
0.01 to 0.25	21
0.26 to 0.5	11
0.51 to 0.75	2
0.76 to 1.0	0
More than 1.0	1

The average rate of progress of astigmatism
per eye per annum in special school
children = 0.03 dioptre.

The average rate of increase in astigma-
tism per eye per annum of ordinary
school children = 0.06 dioptre.

Summary and Conclusions.

In a comparison between the rate of progress in myopic astigmatism of two reasonably comparable groups of seventy-nine children, one group who had been educated in the ordinary schools and the other in special schools, it is found that

(1) In forty-three "pairs", or 54.4 per cent., the rate of increase of simple myopia in children in the ordinary schools was greater than that in children who had attended special schools.

(2) In thirty "pairs", or 38 per cent., the rate of increase of simple myopia in children who had attended the ordinary schools was less than that of children who had attended special schools.

(3) In six "pairs", or 7.6 per cent., the rate of increase in simple myopia was the same in both members.

(4) The average rate of increase of simple myopia per eye per annum in seventy-nine children who had attended special schools was 0.4 dioptre; the average rate of increase of simple myopia per eye per annum of seventy-nine corresponding children who had attended ordinary schools was 0.48 dioptre. This difference of 0.08 dioptre is not statistically significant. The average rate of increase in astigmatism in the special school children was 0.03 dioptre per annum. The average rate of increase of astigmatism of ordinary school children was 0.06 dioptre per annum.

Conclusions as to how far the special school is effective in "dioptre-saving" cannot be drawn from an investigation into comparatively few cases. Moreover, the cases that have been considered had a less severe degree of myopia than those usually admitted to special schools. Only fourteen of them had myopia of over ten dioptries; in only thirteen was the rate of progress more than one dioptre per annum, and, as far as the records showed,

none had fundus changes indicative of a serious condition. The majority of the children therefore had the condition known as "physiological" myopia, and were the Committee's standards of selection applied they would not be admitted to a special school.

On the other hand, it is a reasonable deduction from this investigation that in a considerable proportion of children attending a special school no diminution in the rate of increase of myopia occurs. The investigation emphasizes therefore the need for the most careful examination and consideration of each individual child with myopia before such a child is transferred from the ordinary Public Elementary School to the special school for partially sighted children.

(2) INVESTIGATION INTO THE OPHTHALMIC CONDITION OF MYOPES WHO HAVE BEEN EDUCATED AT SPECIAL SCHOOLS FOR THE PARTIALLY SIGHTED AND THAT OF MYOPES WHO HAVE BEEN EDUCATED AT ORDINARY PUBLIC ELEMENTARY SCHOOLS.

1. *Object of Investigation.*

The object of the investigation was to ascertain what difference, if any, exists in the rate of progress of myopia during the post-school period of myopes who have been educated in ordinary public elementary schools and that of myopes who have been educated in special schools for the partially sighted.

2. *Selection of cases for investigation.*

The conditions laid down for the selection of ex-pupils of the ordinary schools were (a) that they should be cases of uncomplicated myopia, i.e., uncomplicated in the sense of having no other condition present which was not directly due to myopia; (b) that they should have at least 6 dioptries of myopia at the last examination during their school life, and (c) that they should have left school three or more years.

The conditions attached to the selection of ex-pupils of special schools for the partially sighted were (a) that they should be cases of uncomplicated myopia (see above), and (b) that they should have left school three or more years.

Ex-pupils of ordinary schools were drawn from the following areas :—

<i>Area.</i>					<i>Number of Cases.</i>
Wolverhampton	...	...	...	...	24
Smethwick	...	...	...	...	12
Walsall	...	...	...	...	3
West Bromwich	...	...	...	...	4
Birmingham	...	...	...	...	2
Manchester	...	...	...	...	36
Surrey	...	...	...	...	24

Ex-pupils of special schools were drawn from Birmingham and their number was 44.

Selection of the cases in accordance with the conditions laid down by the Committee was made by the School Medical Officers of the areas mentioned above. Ex-pupils were followed up by members of the School Nursing staffs of the respective areas and were induced to come before the ophthalmic surgeons for examination. The Committee wish to acknowledge their gratitude for the help they received from the School Medical Officers and School Nurses of these areas, whose readiness to co-operate and whose efficient administration alone made the investigation possible.

Cases in Wolverhampton, Smethwick, Walsall, West Bromwich and Birmingham were examined by Mr. Archer-Hall; those in Manchester by Dr. Stopford; those in Surrey by Dr. Livingstone.

Ex-pupils of the Birmingham special schools for the partially sighted were examined by Mr. Archer-Hall.

3. Nature of cases investigated.

(a) *Ex-pupils of ordinary schools.*

105 cases were investigated, 41 men, 64 women; the youngest was 16 years of age; the oldest 26.

(b) *Ex-pupils of special schools.*

44 cases were investigated, 20 men and 24 women; the youngest was 17 years of age; the oldest 27.

A grouping of the cases according to the number of dioptries of simple myopia found at the last examination during school life is shown in Table I below.

TABLE I.

Amount of myopia recorded at last examination during school life.

Dioptries of Simple Myopia (Average amount of myopia for one eye. Astigmatism is neglected).	Ordinary school cases.		Special school cases.	
	Cases.	Per cent.	Cases.	Per cent.
Up to 6 dioptries 	40	38	5	11
6·12—8 „ 	29	28	11	25
8·12—10 „ 	25	24	11	25
10·12—12 „ 	9	9	7	16
12·12—15 „ 	2	2	7	16
15·12—20 „ 	—	—	—	—
Over 20 „ 	—	—	3	7

The method of recording the amount of myopia is the same as that described in the previous section of this Appendix. For example, a case whose refraction was recorded as R -6, -8, L -8, -10 was estimated to have simple myopia of 6 dioptries in the right eye and simple myopia of 8 dioptries in the left eye, with astigmatism of 2 dioptries in each eye. The average amount of simple myopia for the case would be 7 dioptries and the case would be entered in the 6·12 to 8 line of the Table.

It will be observed that a considerable number of cases had rather less than 6 dioptries of myopia at the last examination during the school life. These are cases which had 6 or more dioptries in one eye and less than 6 dioptries in the other, bringing the average for the two eyes below 6. It will be observed also that among special school pupils 23 per cent. had simple myopia of more than 12 dioptries, whereas of the ordinary school cases only 2 per cent. had this amount, and that consequently, taken as a whole, the special school cases suffered from a higher degree of myopia and a more severe defect in vision than those in the ordinary schools.

4. *Nature of examination.*

The examination included (a) Refraction from retinoscopy. It was advised that homatropine should be used if the visual acuity after correction was less than 6/18 or if the near vision was less than J1 holding the book as close to the eyes as desired. (b) Condition of fundus. A record of the absence as well as the presence of fundus changes was asked for. (c) Visual acuity corrected and uncorrected, measured by Snellen's long distance chart.

Where possible the history of the ophthalmic condition during school life, taking the form of extracts from the ophthalmic records of the School Clinic, was given as well as a record of the present examination.

5. *Visual acuity.*

All statements as regards visual acuity apply to visual acuity after correction.

(a) *Ex-pupils of Public Elementary Schools.*

Records of the examination showed that 71 had a vision of 6/12 or better in each eye, 34 had a vision of 6/18 or less in one or both eyes. In 26 of these 34 cases fundus changes due directly to myopia accounted for the low degree of visual acuity. In one other case, a female aged 20, there were no fundus changes to account for a fairly low degree of visual acuity, namely 6/9 and 6/18. There was, however, a high degree of astigmatism, the right eye having 4 D, the left 4.5 D. In the remaining 7 cases myopia was associated with some other condition which would in itself cause a diminution in visual acuity. These associated conditions were as follows :—

(a) Calcareous cataract. Visual acuity in right eye = 6/60, left eye no perception of light.

(b) Corneal nebulae in right eye with vision of 6/18; high myopia (-15) with fundus changes in the left which had a vision of 6/36.

(c) Nystagmus.

(d) Corneal leucomata in each eye with moderate degree of myopia. R -5 -7 and L -5. Visual acuity was 6/10 and 6/36.

(e) Retinitis pigmentosa with myopia of -8 in either eye.

(f) Strabismus and nystagmus. Myopia of -7 in R and -11 in L. Vision R = 6/9 and L = 6/24.

(g) Albinism combined with moderate degree of myopia, R being -6.5 -10.5 and L -10 -6. Vision R = 6/18 and L = 6/18.

Comparing the visual acuity recorded at the last examination during school life with that recorded at the present examination we find that—

45 exhibited no change in visual acuity.

34 showed a visual acuity slightly better than at the previous examination.

15 showed a visual acuity worse than that found at the previous examination.

Of the 15 cases which showed a diminution in visual acuity, in 5 only was there a material decrease represented by 2 or more lines on Snellen's Test Card.

In 11 cases the record of visual acuity at the last examination during school life was not available.

(b) *Ex-pupils of Special Schools.*

Records show that at the time of the examination 17 had a visual acuity of 6/12 or better in each eye and 27 had a visual acuity of 6/18 or worse in one or both eyes. In 19 of these 27 cases the poor degree of visual acuity was due directly to fundus changes. In one other case a vision of R 6/18 and L 6/12 was coincident with simple myopia of 9.5 dioptres in each eye, but there were no fundus changes. In the remaining 7 cases there were associated conditions which would in themselves cause diminution in visual acuity or render the test of visual acuity unreliable but which were not directly due to myopia. These conditions were as follows :—

Strabismus (3 cases). Lateral nystagmus (1 case). Cataract (1 case). Mental deficiency (2 cases).

Table II shows a comparison between the changes in visual acuity occurring in ex-pupils of ordinary schools and that of ex-pupils of special schools during the post-school period.

TABLE II.
Changes in visual acuity.

	Ex-pupils of Ordinary Schools.		Ex-pupils of Special Schools.	
	Case.	Per cent.	Case.	Per cent.
No change	45	48	12	27
Improved	34	36	14	32
Diminished	15	16	18	41
Marked decrease, i.e., measured by two or more Snellen's lines ...	5	5	8	18

The nature of cases showing decrease in visual acuity is shown in Table III.

TABLE III.
Nature of Cases showing decrease in Visual Acuity.

Ex-Public Elementary School Children.			Ex-Special School Children.	
Degree of Simple Myopia found at last examination during school life. (Average per eye).	Number of Cases.	Average increase in Simple Myopia per eye per annum during post school period.	Number of Cases.	Average increase in Simple Myopia per eye per annum during post school period.
Up to 6 dioptries ...	7	0.52	3	0.15
6.12 to 8 dioptries ...	6	0.36	4	0.23
8.12 to 10 „ ...	—	—	4	0.43
10.12 to 12 „ ...	1	0.89	4	0.30
12.12 to 15 „ ...	1	0.4	1	0.32
More than 15 dioptries	—	—	2	0.47

No definite conclusions can be drawn with regard to the changes in visual acuity of ex-pupils of the ordinary schools and those of the special schools except that a greater percentage of the latter showed decrease in visual acuity during post-school years. This is probably accounted for by the greater severity of eye defect in ex-special school pupils.

6. Increase in Myopia.

A grouping of the cases according to the total increase in simple myopia (average per case, neglecting changes in astigmatism) is shown in Table IV. The method of estimating and recording increase in simple myopia is the same as that explained in the previous section of this Appendix.

TABLE IV.
Total Increase in Simple Myopia.

Total increase in Simple Myopia (Average per eye).					Ex-Pupils of Ordinary Schools.		Ex-Pupils of Special Schools.	
					Cases.	Per cent.	Cases.	Per cent.
0 dioptre ...	...	...	...	...	15	15	—	—
0.12 to 2 dioptries ...	...	...	...	...	46	45	19	43
2.12 to 5 „ ...	...	...	...	...	37	35	19	43
5.12 to 8 „ ...	...	...	...	...	4	4	5	11
More than 8 dioptries	...	...	...	...	2	2	1	2

It will be observed that 13 per cent. of ex-pupils of special schools but only 6 per cent. of ex-pupils of the ordinary schools exhibited an increase of more than 5 dioptries of myopia.

Next is shown in Table V a grouping of the cases according to the rate of increase of simple myopia per annum during the post school period.

TABLE V.

Grouping of Cases according to the Average Increase per annum in Myopia.

Rate of increase in Simple Myopia (per eye per annum).	Ex-Pupils of Ordinary Schools.				Ex-Pupils of Special Schools.			
	Number of cases grouped according to Period between last examination in School life and present examination.			Whole Group.	Number of cases grouped according to Period between last examination in School life and present examination.			Whole Group.
	0-5 years.	5-10 years.	10+ years.		0-5 years.	5-10 years.	10+ years.	
0 dioptre	4	9	1	14 or 13 %	1	—	—	1 or 2 %
0.01—0.25 dioptries	17	18	9	44 or 42 %	3	9	4	16 or 36 %
0.26—0.5 „	6	19	7	32 or 30 %	6	5	5	16 or 36 %
0.51—0.75 „	2	6	1	9 or 8 %	3	2	1	6 or 14 %
0.76—1 „	1	3	—	4 or 4 %	2	1	—	3 or 7 %
1.01—1.5 „	1	1	—	2 or 2 %	2	—	—	2 or 4 %

It will be observed that the average rate of increase was greater than 0.5 dioptre per annum in 14 per cent. of the ex-pupils of the ordinary schools and in 25 per cent. of the ex-pupils of the special schools.

As regards the total increase in simple myopia and the rate of increase in simple myopia during the post-school period, the special school group compares unfavourably with the ordinary school group. The greater severity of the defect in the special school group, however, must be taken into account. The relationship between the rate of increase of simple myopia and the amount of myopia found at the last examination at school is given in Table VI. It will be seen that the higher the amount of myopia found at the initial examination, the greater is its tendency to increase.

In Table VII is set out the average rate of increase in myopia per eye per annum during the post-school period of ex-pupils of Public Elementary Schools and of special schools.

TABLE VI.

Post-School Period.

	Ex-Public Elementary School Children.				Ex-Special School Children.			
	Number of cases.	Rate of Increase in Simple Myopia per annum (Average per eye).	Rate of Increase in Astigmatism per annum (Average per eye).	Average number of years between date of last examination at school and present examination.	Number of cases.	Rate of Increase in Simple Myopia per annum (Average per eye).	Rate of Increase in Astigmatism per annum (Average per eye).	Average number of years between date of last examination at school and present examination.
Degree of Simple Myopia recorded at last school examination (Average per eye).								
Up to 6 dioptres...	40	0.25	0.03	7.0	5	0.16	— 0.06	9.2
6.12 to 8 "	29	0.26	0.04	7.5	11	0.37	— 0.01	7.1
8.12 to 10 "	25	0.24	0.03	7.1	11	0.42	— 0.02	7.1
10.12 to 12 "	9	0.29	0.04	8.4	7	0.32	— 0.06	6.6
12.12 to 15 "	2	0.62	0.03	8.0	7	0.44	— 0.05	8.0
More than 15 "	—	—	—	—	3	0.55	0.02	8.7

TABLE VII.

Particulars relating to Post-School Period only and to all children examined.

Number of years between date of last examination at school and present examination.	Ex-Public Elementary School Children.				Ex-Special School Children.			
	Number of cases.	Rate of Increase in Myopia per annum (Average per eye).	Rate of Increase in Astigmatism per annum (Average per eye).	Average number of years between date of last examination at school and present examination.	Number of cases.	Rate of Increase in Myopia per annum (Average per eye).	Rate of Increase in Astigmatism per annum (Average per eye).	Average number of years between date of last examination at school and present examination.
0-5	31	0.26	0.09	4.1	17	0.52	—	4.6
5-10	56	0.29	0.05	7.7	17	0.33	—	7.8
Over 10	18	0.24	0.005	11.6	10	0.30	—	12.3
Whole Group	105	0.28	0.04	7.2	44	0.40	—	7.6

The figures in Table VII have been submitted to statistical analysis, and the following conclusions with regard to them may legitimately be made :—

(a) In the 0-5 year group the difference between the rate of increase in simple myopia of the ex-pupils of the Public Elementary Schools and ex-pupils of the special schools, amounting to 0.26 dioptré, is statistically significant and may be taken as a real one.

(b) In the 5-10 and 10+ year groups the differences are so small that chance factors may be responsible for them.

(c) In dealing with the whole group the difference of 0.12 dioptré is statistically significant.

Finally, we give Table VIII showing a comparison of the average rate of increase in myopia per annum during the school period and post-school period of both groups of cases.

TABLE VIII.

Particulars relating to children for whom ophthalmic records during school period were available.

(1) Ex-Public Elementary School Children.

Number of years between date of last examination at school and present examination.	School Period.				Post School Period.			
	Number of cases.	Rate of Increase in Myopia per annum (Average per eye).	Rate of Increase in Astigmatism per annum (Average per eye).	Average number of years covered by ophthalmic examination at school.	Number of cases.	Rate of Increase in Myopia per annum (Average per eye).	Rate of Increase in Astigmatism per annum (Average per eye).	Average number of years between date of last examination at school and present examination.
0-5	24	0.51	0.07	3.7	24	0.25	0.11	3.9
5-10	29	0.64	nil	3.8	29	0.27	0.04	7.2
Over 10	3	0.96	0.05	3.3	3	0.19	0.01	11.0
Whole Group	56	0.60	0.03	3.7	56	0.28	0.06	6.0

(2) Ex-Special School Children.

0-5	17	0.31	0.03	4.9	17	0.52	—	4.6
5-10	17	0.46	0.07	5.0	18	0.33	—	7.7
Over 10	7	0.72	0.02	3.1	7	0.35	—	12.0
Whole Group	41	0.45	0.04	4.7	41	0.41	—	7.1

The figures in this Table have also been submitted to statistical analysis and the following conclusions may be made :—

TABLE VIII (1).

(a) In the 0-5 and 5-10 year groups there are differences between the rate of increase of simple myopia during the school period and during the post-school period, namely 0.26 and 0.37, which are significant.

(b) The number of cases in the 10+ year group is too small to enable any deductions to be drawn.

(c) In the whole group the difference of 0.32 dioptre in the rate of increase is statistically significant.

TABLE VIII (2).

(a) In the 0-5 year group the difference between the rate of increase in simple myopia during the school period and the post-school period is 0.21 dioptre, which is large enough to be statistically significant.

(b) In the 5-10 year group and 10+ year group and in the group taken as a whole the differences are not large enough to justify conclusions being drawn from the figures.

TABLE VIII (1) AND (2).

(a) The difference between the rate of increase in simple myopia of all the ordinary school children and that of special school children during the school period is 0.15 dioptre, which is statistically significant.

(b) The difference between the rate of progress in simple myopia during the 0-5 years post-school period, of ex-pupils of the Public Elementary Schools and ex-pupils of the special schools is 0.27 dioptre, which is statistically significant.

(c) The figures relating to the changes in astigmatism are too small to justify any conclusion being drawn.

7. Conclusions.

Although the number of cases covered by this investigation is small, statistical analysis of the Tables justifies us in drawing the following conclusions with regard to the behaviour of myopia in the group of ex-pupils of the ordinary schools and that of ex-pupils of the special schools which we have had under consideration.

(i) The rate of increase in simple myopia during school life was on the average greater in children attending the Public Elementary Schools (0.60 dioptre) than in those attending special schools (0.45 dioptre) (Table VIII). (See also Part (1) of this Appendix).

(ii) The rate of increase in simple myopia in children attending the Public Elementary Schools diminished after they left the schools (Table VIII (1)).

(iii) The rate of increase in myopia of children attending the special schools accelerated for a period, probably not exceeding five years, after they had left school. (Table VIII (2)).

(iv) Ex-pupils of the special schools showed a greater rate of increase in myopia than ex-pupils of the ordinary schools during a period, probably not exceeding five years, after leaving school. Later, however, this rate of increase slowed down and approximated to the more uniform rate of increase exhibited by the ex-pupils of the ordinary schools (Table VII).

(3) SOME CASE RECORDS OF MYOPES WHO HAVE BECOME, OR WHO ARE LIKELY TO BECOME, BLIND.

A note on the occurrence of blindness (i.e. a visual defect so severe as to cause the admission of the person to the blind register), or the possibility of the occurrence of blindness in the individuals coming under the investigation described in Part (2) of this Appendix is of interest.

(a) *Ex-Pupils of the Ordinary Schools.*

No individual who had attended the ordinary school had, up to the time of the examination, been registered as a blind person. Records show, however, that there is a high probability of blindness in 4 cases. These are as follows:—

Case No. 4, male, age 22. Examined at the age of 13, when he had 11 dioptries of simple myopia in right eye and 12 dioptries in left. Vision was 6/36 and 6/36; large posterior staphylomata were present in both eyes. Nine years later, when he was re-examined for the present investigation the myopia in the right eye had increased. The principal axes in the right eye were - 20.0 - 21.5 and in the left eye - 19 and - 20.5, an increase of 9 dioptries of simple myopia in the right and 7 dioptries in the left eye, with an increase of 1.5 dioptries of astigmatism. Retina showed thinning at the posterior poles (macular region). There were vitreous opacities. The vision after correction was R 6/60 and L 6/60. This man is employed as a store keeper, and does about 5½ hours' writing a day.

Case No. 18, female, aged 18. She was examined at school at the age of 8 when it was found that she had simple myopia of 14 dioptries in both eyes. The lenses were displaced downwards and showed peripheral opacities. Changes were present at both maculae and retinae were thinned. The vision in each eye was 6/60. At the examination for this investigation when this girl was 18 years old, the simple myopia had increased to 20 dioptries in each eye, and fundus degeneration had become more extensive. Vision in the right eye was less than 6/60, and in the left, 6/60. She has been in domestic service since leaving school.

Case No. 89, male, aged 25. The present examination shows simple myopia of 8 dioptres with 1 dioptre of astigmatism in each eye. The cause of loss of vision in this case is retinitis pigmentosa. Present visual acuity is R 6/18 and L 6/24, but there is no note of the field of vision.

Case No. 86, male, aged 22. He was examined at school at the age of 12, and was found to have 9 dioptres of simple myopia in right eye and 8·5 in left with retino-choroidal changes around discs. At the age of 22, when he was examined for this investigation, he had simple myopia of 12 dioptres with 1·75 dioptres of astigmatism in the right and 11·5 dioptres of simple myopia and 0·75 dioptres of astigmatism in the left. Fundus changes were extending and there were vitreous opacities in both eyes. The vision was R6/24 and L6/36. In view of the gradual extension of degenerative changes there is a high probability that this man will lose his sight within a comparatively short period.

In addition to the cases above, which will in all probability become registered as blind persons, there are two cases in which the sight of one eye has been lost, while the sight of the other eye remains comparatively good. These are as follows.

Case No. 3, male, aged 18. Examined during the school period at the age of 12, when he was found to have 10 dioptres of simple myopia in the right eye and 2 dioptres in the left. Vision in right eye was less than 1/60 (amblyopia), vision in the left eye was 6/18. At the present examination myopia in the right eye had increased to 14 dioptres of simple myopia, with 2 dioptres of astigmatism, while that of the left had increased to 3. In the right eye is a large crescent with thinning of retina and vitreous opacities. The left has a normal fundus.

It is interesting to note in this case that during the school period the simple myopia in the right eye increased by 4 dioptres and the astigmatism by 2 dioptres in six years, although that eye could not have been used for reading.

Case No. 70, male, aged 22. Examination during the school period at the age of 13 showed that there was simple myopia of 2 dioptres and 1·5 dioptres of astigmatism in the right eye, and 13 dioptres of simple myopia with 2 of astigmatism in the left. The left eye was amblyopic. Six years after, at the present examination, the myopia in the right eye had increased by 2·5 dioptres of simple myopia, and that of the left by 7 dioptres. A myopic crescent was found in the right eye and a large staphyloma in the left. Vision in right eye 6/6, in left less than 1/60 (amblyopia). Again, although the left eye had not been used for near work for at least six years the myopia had increased by 7 dioptres.

These two cases indicate clearly that the use of eyes for near work cannot be regarded as the only factor in causing increase in myopia.

(b) *Ex-Pupils of Special Schools.*

Among the ex-pupils of the special schools 2 became blind and were registered as blind persons. Details of these cases are as follows :—

Case No. 10, female, aged 21. When first examined at the age of 8 she had 15 dioptries of simple myopia with 3 of astigmatism in the right eye, and 16 dioptries and 3 of astigmatism in the left. After a period of six years, i.e., when she left school, she had an increase in the right eye of 2 dioptries of simple myopia and in the left of 1. At this period her vision was less than 6/60 in both eyes. Shortly after she was sent to an Institution for the Blind to learn a trade suitable for a blind person. It is not clear from the record exactly when she became certified as blind. At the last examination in April, 1933, she had simple myopia of 22 dioptries with 2 dioptries of astigmatism in the right eye, and 23 dioptries with 1·5 dioptries of astigmatism in the left, with choroido-retinal degeneration in each eye.

Case No. 53, male, aged 26. At the first examination at the age of 11 he had simple myopia of 12 dioptries with 4 dioptries of astigmatism in the right eye, and 14 dioptries with 3 dioptries of astigmatism in the left. The myopia continued to increase at the rate of about one dioptre a year during school life. At the recent examination there were 20 dioptries of simple myopia with 5 dioptries of astigmatism in the right eye, and 23 dioptries with 4 dioptries of astigmatism in the left. The fundus showed large crescents, thinned retinæ and macular degeneration. His vision was less than 6/60 in both eyes. He was transferred to the Workshops for the Blind at the age of 18.

In addition to the case described above another became blind in one eye. Details are as follows :—

Case No. 56, male, aged 20. At the first examination when he was nine years of age he had 10 dioptries of simple myopia with 2 dioptries of astigmatism in the right eye, and 10 dioptries with 3 dioptries of astigmatism in the left. Four years later, while he was in the special school, detachment of the retina occurred in the right eye, whereas the left eye showed an increase of about 4 dioptries of myopia. At the time of the last examination he had no sight in the right eye, but in spite of the left eye having 16 dioptries of a simple myopia with 2 dioptries of astigmatism, the vision after correction in that eye was 6/6.

The following cases, though having useful sight at present, will in all probability be certifiable under the Blind Persons Act in the future :—

Case No. 23, female, aged 23. Examination at the age of 6 showed that the right eye had 7 dioptries of simple myopia with 2 dioptries of astigmatism, and the left eye had 7 dioptries of simple myopia. This increased by about 2 dioptries of simple myopia during school life, but during the 14 years which elapsed between the last examination during school life and the recent examination it had increased by more than 8 dioptries in each eye. In the left eye the retina was detached and there was a cataract. The right eye showed a large crescent with retinal thinning and had a vision after correction of 6/18.

Case No. 49, male, aged 23. At the first examination at the age of 10 he had 16 dioptries of simple myopia in each eye. This increased by one dioptre during the four remaining years of school life. At the recent examination he had 21 dioptries of simple myopia with 2 dioptries of astigmatism in the right eye, and 23 dioptries of simple myopia in the left, with choroido-retinal thinning and degeneration. His vision was R 6/24 and L 6/18. Although at present his sight allows him to follow sighted employment the prognosis of this case is bad.

Case No. 55, male, aged 25. At the recent examination it was found that he had 9 dioptries of simple myopia with 2 dioptries of astigmatism in the right eye, and 11 dioptries with 3 dioptries of astigmatism in the left. There was choroido-retinal degeneration in each eye. Vision is R 6/36 and L 6/24 after correction.

The following case is interesting as again illustrating the increase in myopia which may occur in an amblyopic eye :—

Case No. 51, male, aged 27. At the last examination during school life at the age of 14 the right eye had 15 dioptries of simple myopia and the left 4·5 dioptries. The right eye was amblyopic. In spite of disuse this eye showed an increase of 4 dioptries of simple myopia in the course of 13 years. On the other hand the left eye showed an increase of 8·5 dioptries of simple myopia.

(c) *Summary.*

(1) Of 105 ex-pupils of the ordinary schools none had become certifiable as blind under the Blind Persons Act but four were in danger of becoming certifiable under this Act in the near future; in one of the four individuals however the danger to eyesight was due to retinitis pigmentosa.

(2) Of 44 ex-pupils of the special schools two had become certifiable as blind under the Blind Persons Act, and three were in danger of becoming certifiable under this Act in the near future.

(3) Records of three cases are given in which the myopia continued to increase after an eye had become amblyopic, thereby indicating that the use of the eyes for near work cannot be regarded as the only factor causing increase in myopia.

(4) GENERAL CONCLUSIONS.

The investigations described in the previous parts of this Appendix give certain facts relating to the behaviour of myopia in a special school group and an ordinary school group. The number of cases composing each group is small, and in the investigations described in parts (2) and (3), the special school group and the ordinary school group are not strictly comparable as regards the degree and severity of myopia. Consequently the conclusions based on a review of these facts, though true of the groups under consideration, must not be taken as generalisations. These investigations, however, emphasise the need for further research into problems connected with myopia, and the Committee suggest the following lines along which inquiry might be profitably directed :—

(i) The view that the régime of the special school for partially sighted children diminishes the rate of increase of myopia in children attending such a school may be generally accepted. This diminution is, however, by no means invariable in every case, nor is it so great as to justify the admission of myopes to special schools without careful consideration of the various factors in each individual case. As a general principle it is suggested that children with “physiological” myopia can attend the ordinary elementary school without risk to eyesight, while children with “pathological” myopia should always be admitted to special schools for the partially sighted. At present, however, we have no means of clearly distinguishing between the two types at an early age, but further research might elucidate this problem.

(ii) The investigation described in part (2) of this Appendix suggests that the rate of increase in myopia during the years immediately following the school period is greater in children who have attended a special school than it is in children who have attended an ordinary school. In certain cases, therefore, it appears that the benefit as regards “diopetre saving” of the special school is partly nullified by the greater rate of increase of myopia during post-school years. How far this important reaction is general, and to what extent it is due to the removal of restrictions imposed in the special school are matters for further research.

(iii) The influence of myopia in causing blindness and the part played by the special school in preventing such blindness is the most important of all problems with regard to myopia which needs further consideration. The use of the Standard Form and Certificate drawn up by the Prevention of Blindness Committee of the Union of Counties Associations for the Blind, and recommended for use by Local Authorities by the Ministry of Health and Board of Education, should in the future furnish information which will form a basis for further investigation into myopia as a cause of blindness and the influence of the special school in preventing the complications of myopia which may cause blindness.

APPENDIX D.

Specimens of Circulars giving advice to Parents of Partially Sighted Children.(a) *Liverpool Education Committee.*

IMPORTANT NOTICE.

Care of Seriously Defective Eyes.

To the Parents or Guardians of.....

Your child suffers from a serious defect of vision, which quite prevents him (or her) from joining in the ordinary work of an elementary school; indeed, such work would be most harmful. This defect is permanent, and liable to get worse and bring on disease in the eyes unless great care is exercised, both at school and at home, so that in the best interests of the child your help is essential. It is therefore very desirable that the child should be taught in a special class for children who have weak sight, and for whom a special scheme of school work has been devised. Until admission to such a class can be arranged, the child may attend an elementary school, and sit in the front row of the class, with a view to gaining the educational advantages of school discipline and drill, along with such general knowledge as can be given in the oral lessons of the classes. Reading or writing of any kind (except blackboard work) must not be undertaken except at the special class.

These restrictions are made with a view to the child's future welfare as to sight and ability to earn a livelihood, but are absolutely useless without your careful and continued co-operation at home.

You are particularly requested to watch the child and to pay constant attention to the following important points:—

(1) Follow the general directions as to the wearing of the spectacles (see separate sheet).

(2) *Stop completely all reading and writing.* Books, pens, paper, pencils and slates should not be used. In the case of a girl, *sewing must also be stopped*, but knitting may be done, provided the child does it by feeling the stitches and not by looking at them.

(3) Let the child be out of doors as much as possible, and be taught games and outdoor play, but violent gymnastic exercises and rough games should be avoided.

(4) Impress upon the child that it is because of the importance of taking care of the eyes that these restrictions are made for his (or her) benefit in after life, and that the child must do at home only what is taught and allowed at school.

W. M. FRAZER,

Medical Officer to the Education Authority.

(b) *Leeds Education Committee.**Medical Inspection of School Children.*

To the Parent or Guardian of.....

Your child's sight will probably become worse each year, *but* you can largely prevent this by carrying out the following suggestions until the age of 21, when the eyes will have become stronger and able to bear the strain:—

(a) Don't let the child do much close work (for example, reading and sewing) at any time.

(b) Don't let the child do *any* close work by artificial light (*i.e.*, reading at night, etc.).

(c) Don't let the child stoop over the work if it can be avoided.

(d) Get a good light on the work. (The best is from a window behind the left shoulder.)

(e) Let the child wear the glasses *always*. (It may be easier to read without them but that would damage the sight.)

(c) *Ealing.*

(NOTE.—There is no School for the Partially Sighted in this area.)

MYOPIA OR SHORT SIGHT.

Advice to Parents.

Your child is suffering from Myopia or short sight which is liable to get much worse unless strict precautions are taken. Your attention to the following advice will materially help in preventing the condition from increasing:—

(1) Glasses should be constantly worn.

(2) When broken, the glasses should be immediately repaired and all near work for the eyes strictly prohibited in the meantime.

(3) The lenses should be kept quite clean. It is important that the frames should be put right whenever they get bent. The spectacles must rest level in front of the eyes.

(4) When reading and writing at school has been allowed by the School Medical Officer, all books must be held at least 12 inches from the eyes, and in a very good light.

(5) At home it is advisable that all near work for the eyes such as reading, writing, and sewing should be strictly forbidden. Attendance at Cinemas should be forbidden.

(6) Music, particularly piano-playing and singing by ear should be encouraged. The piano should be so placed that the music is well lighted.

(7) Jumping, *stooping exercises*, diving and those exercises which jar the body should be avoided. Other quiet exercises

and dancing may be allowed. Football and games with a hard ball should be prohibited.

(8) Every effort should be made to keep the general health at the highest possible standard. Constipation and coughs should receive treatment.

(9) Whilst attending school your child will have the eyes re-tested every twelve months and it is most important in the interests of the child that appointments at the School Clinic should be strictly kept.

THOMAS ORR, M.D., D.Sc.,
School Medical Officer.

May, 1926.

(d) *County Borough of Birkenhead.*

Medical Officer's Department.

EYE CLINIC.

Rules to be observed by Children suffering from Short Sight (Myopia).

Short Sight in children is a condition of the eyes which often gets worse during the growing period in life, and then not only are stronger glasses required but the sight becomes more imperfect and damaged.

If parents or guardians of these children will see that their children form the *habit* of following the rules given below they will be helping to prevent the shortsightedness growing worse.

All children who suffer from short sight should always:—

- (1) Work in a *good light* which is *not facing* the eyes.
- (2) Avoid the *stooping* position for near work (reading).
- (3) *Restrict* the amount of work done by *artificial* light.
- (4) Take frequent rests for the eyes by looking at distances.
- (5) Hold all *near work* at least *13 inches* away from the eyes.
- (6) Never read by *firelight* or *twilight*.
- (7) Never read in a reclining position (e.g., *in bed*).
- (8) Take plenty of exercise in the *open air*. This is not only good for increasing the general bodily tone, but also rests the eyes from near work.

D. MORLEY MATHIESON, M.D.,
School Medical Officer.

APPENDIX E.

(See Chapter V, pages 70-71.)

Urban Areas in England and Wales with 10,000 or more children on the Public Elementary School registers where there is no School for the Blind or Partially Sighted maintained by the Local Education Authority.

Local Education Authority.	Number of Children on Public Elementary School registers 31st March, 1933.		Number of Partially Sighted Children ascertained 31st December, 1932.				Ascertainment per 1,000 Public Elementary School Children.	Number expected on basis of 1 per 1,000.
	Number.	Group.	In Special Schools.	In Public Elementary Schools.	Elsewhere.	Total.		
Barking	13,389	10-20,000	—	8	3	11	0·82	13
Barnsley	12,914	"	1	25	6	32	2·48	13
Blackpool	10,362	"	—	—	—	—	—	10
Bootle	11,762	"	—	—	—	—	—	12
Brighton	16,927	"	5	—	—	5	0·30	17
Chesterfield	10,737	"	—	1	—	1	0·09	11
Darlington	10,667	"	2	—	—	2	0·19	11
Doncaster	10,040	"	1	—	2	3	0·30	10
Dudley	10,272	"	—	19	—	19	1·88	10
Ealing	12,896	"	—	17	—	17	1·32	13
Grimsby	13,883	"	—	14	3	17	1·22	14
Halifax	11,198	"	—	—	2	2	0·18	11
Hendon	14,131	"	2	—	—	2	0·14	14
Heston and Isleworth	10,268	"	1	6	—	7	0·68	10
Huddersfield	13,326	"	2	—	1	3	0·23	13
Ilford	18,220	"	5	9	1	15	0·82	18
Ipswich	11,859	"	—	17	3	20	1·69	12
Leyton	16,159	"	15	—	2	17	1·05	16
Merthyr Tydfil	12,963	"	2	23	4	29	2·24	13

Newport (Mon.)	14,531	—	18	6	24	1.65	15
Northampton	12,623	—	3	—	3	0.24	13
Norwich	17,640	—	—	9	9	0.51	18
Preston	18,290	12	—	—	12	0.65	18
Reading	12,687	5	—	—	5	0.40	13
Rochdale	11,858	4	11	—	15	1.26	12
Rotherham	11,885	—	33	—	33	2.78	12
Smethwick	12,292	6	3	—	9	0.73	12
Southeast-on-Sea	11,614	3	11	—	14	1.21	12
Southport	15,553	3	1	1	5	0.32	16
Stockton on Tees	11,710	—	11	—	11	0.94	12
Tynemouth	10,844	2	41	—	43	3.97	11
Wallasey	10,954	4	3	—	3	0.27	11
Walsall	17,394	—	17	5	26	1.50	17
Warrington	12,843	7	—	—	7	0.55	13
West Bromwich	14,020	—	5	—	5	0.36	14
West Hartlepool	12,205	—	13	—	13	1.07	12
Wigan	13,653	2	7	—	9	0.66	14
Coventry	25,063	—	4	—	4	0.16	25
Derby	21,578	—	—	—	—	—	22
Gateshead	21,474	1	64	—	65	3.03	21
Middlesbrough	24,868	—	5	—	5	0.20	25
Plymouth	29,231	3	—	1	4	0.14	29
Rhondda	27,896	9	5	—	14	0.50	28
St. Helens	21,167	—	28	—	28	1.32	21
Southampton	24,457	8	1	4	13	0.53	24
Swansea	27,122	—	6	2	8	0.29	27
Tottenham	22,987	19	—	—	19	0.83	23
Willesden	21,252	16	1	1	18	0.85	21
Wolverhampton	20,804	—	6	1	7	0.34	21
Stoke on Trent	48,209	—	47	—	47	0.98	48
Manchester	113,446	—	148	3	151	1.33	113
West Ham	50,926	15	1	5	21	0.41	51
Totals	—	155	632	65	852	—	985

APPENDIX F.

An Educational Test of Partially Sighted Children,
being the Report on an Investigation carried out for the Committee by Mr. J. Lumsden, H.M. Inspector of Special Schools, Board of Education.

Introduction (§ 1).

Part I: Preparatory.

Description of the Tests Used (§ 2).

Selection of Children to be Tested (§ 3).

Administration of the Tests (§ 4).

Part II: Findings.

Numbers and Ages of the Children (§ 5).

Intelligence of the Children by Groups (§ 6).

Attainments of the Children by Groups (§ 7).

Performance in different subjects of the Curriculum (§ 8).

The Influence of Type of Defect and Visual Acuity upon Performance (§ 9).

The Effect of Size and Type of Special School upon Performance (§ 10).

The Effect of Restrictive Special Methods upon Performance (§ 11).

Conclusions (§ 12).

NOTES.

I. Note on the Binet Tests employed.

II. Note on Statistical Terms used.

1. *Introduction.*

The purpose of the Investigation was to obtain information likely to be useful to the Committee on Partially Sighted Children by attempting to find out how the educational standing of partially sighted children is affected by the conditions from which they suffer and by the various modifications which have been made in the curriculum and organization of the schools in which they are educated. Since in the Committee's Report a full description of these types of eye defect and of the educational provision now made has been given in Chapter II and Chapter IV there is no need to repeat it here. Briefly and for educational purposes the main distinctions drawn are between myopic and non-myopic children, and between those with fairly good and fairly poor sight. Some of the children are in Public Elementary Schools, others in special schools for the partially sighted; of the latter some are very small, consisting of only one class, others have four or more classes; some are "segregated," others "non-segregated;"* some are under the

* See Chapter V of the Committee's Report.

supervision of ophthalmic surgeons who impose few restrictions upon the methods of teaching, others have considerable modification made in the interests of eyesight.

In order to obtain a general idea of the standard of work done in the special schools for the partially sighted, visits were paid to the majority of such schools in England, and the general opinion was formed that, while many of the schools were doing excellent work, and while the children were in many, if not all, obtaining care superior to that which they would have obtained had they been in a Public Elementary School, the general education could not compare with that given in the ordinary schools. Moreover, the intelligence of the children appeared to vary widely from school to school, and it was difficult to make comparisons which could not be objected to on that score. The Committee therefore asked that a survey be made with an educational test which might yield more definite data, and that comparisons should be instituted between the following :—

(1) Partially sighted children in various types of school, and elementary school children with normal sight.

(2) Myopic and non-myopic partially sighted children.

(3) Partially sighted children with poorer and with better sight.

(4) Large and small special schools for partially sighted children.

(5) Segregated and non-segregated schools.

(6) Schools with many and with few restrictions on methods.

Part I.—Preparatory.

2. Description of Tests used.

No examination or test can do justice to every side of a school's activity or fully assess the results of a child's education. The tests used in this investigation deal only with the fundamentals of Arithmetic and English. Singing, Nature-Study, Literature and Art, as well as the more advanced branches of Arithmetic and English which properly find a place in the upper classes of the elementary school were not tested. It should therefore be noted in interpreting the results that the tests were designed not to measure all the results of education, but to tell whether a basis had been laid on which education in the wider sense could be built. They test whether a child can perform the mechanical operations of arithmetic accurately and with a fair speed, grasp and solve a simple problem, and manipulate the easier mathematical symbols; they show the child's knowledge of word-meaning, his ability to comprehend a sentence as a whole and follow the argument of a simple paragraph; they reveal his knowledge of a few of the salient facts of history and geography, and his ability to spell common words. The third R of the three—writing—was purposely omitted because

of the difficulty of measuring on any generally accepted scale the writing of children who habitually use chalk or crayon.

In order to impose as little strain as possible on the myopes, and to enable even the children with poorest sight to read them, the tests were printed in 24 point "Clear Type" on buff crown sheets folded once, making booklets 15 inches by 10 inches. This was found to be the largest size of booklet which could conveniently be opened on a desk, and the largest size of type which would allow a sufficient amount of print per page. It is also the size and style of type adopted by the American publishers of books for sight-saving classes.

A modified form of Burt's Northumberland (1925) Group Tests in English and Arithmetic was used with the permission of Professor Cyril Burt, and the publishers, the University of London Press, who kindly allowed them to be reprinted for this investigation. Reasons of space and time in administration made it necessary to halve most of the tests by omitting alternate items. A new arithmetical problems test was made up of items from Burt's reasoning and mental arithmetic pages with the addition of some very easy items. A new spelling test was substituted for Burt's (which was not suitable for these particular children), consisting of twenty words from Boyd's Spelling List arranged in rough order of difficulty after trial on one class. The advantages of using a test which has already been standardised are that all the individual questions have been found by experience to be fair questions for Public Elementary School children, that the wording of the questions is free from ambiguity and that the questions are properly graded in difficulty. As the test was altered completely in length and form there was no possibility of using previously established norms.

As reprinted, the tests consisted of six Arithmetic sub-tests: (1) Addition, (2) Subtraction, (3) Multiplication, (4) Division, (5) Problems, (6) Rules; and seven English sub-tests: (1) Reading Questions, (2) Vocabulary, (3) Reading Sentences, (4) Reading Paragraphs, (5) Geography, (6) History, (7) Spelling. Directions which were read aloud by the examiner were printed at the head of the sub-tests, each of which was timed separately.

In order that differences in intelligence might be detected and allowed for a test of intelligence was added in the examination of a proportion of the children.

As no group intelligence tests for normally sighted children could be used for partially sighted children since the result would be vitiated by their inability to read the small type in which the tests are printed, or at least by their unfamiliarity with it, the Stanford Revision of the Binet Scale (an individual test) was used, with the omission of a few items for which the use of close sight is essential (a list is given in Note I at the end of this Appendix). Where possible the "Alternative Tests" provided in the Scale were used to make up the required number, and where these were insufficient, the directions for scoring the shorter form of the Scale were followed. As this intelligence test requires a large amount of time (approximately 35 minutes per child) it was felt that an adequate estimate of the general level of intelligence would be obtained by testing one-third of the number of special school children. These were chosen at random:—pupils whose names in the registers came after the letter "P." One-third of the partially sighted children in Public Elementary Schools were also tested with this Test. As it was impossible to spend the time necessary to administer this Test to the fully sighted children in Public Elementary Schools, "The Simplex Intelligence Scale" (by C. A. Richardson: published by Messrs. G. G.

Harrap and Son), a group test which has been standardised against the Binet Scale and which gives comparable intelligence quotients, was used for these children and given to every second child on the list.

3. *Selection of children to be tested.*

It was necessary to have three main groups of children :—

(1) A sample of the partially sighted children in Special Schools for the Partially Sighted (The Special Schools Group).

(2) A sample of the partially sighted children in Public Elementary Schools.

(3) A number of fully sighted children in Public Elementary Schools with whom to compare the other groups.

Since a group-test had for reasons of time to be employed only the older children who were able to read directions could be tested. It was decided therefore to take only those children who had passed their 10th birthday. It was also considered advisable in the Special Schools Group to test only those children who had been in special schools for three years or more at the date of examination, since to take children who had been only a short time in a special school would measure the results of work they had done not in these schools but in their previous elementary school, if any.

To get some idea of the number of these children a circular letter was sent to all Local Education Authorities who maintain special schools for the partially sighted asking for a return of the number of children over 10 on 1st January, 1933 who would then have been three years or more in such a school. A return was made of 889 children in 42 schools, of which a selection of 19 schools (containing 385 such children) of every type was made, on the basis of the proportion of children in each type in the whole country, and in 18 of these all the children who fulfilled the conditions as to age and length of attendance on the day of examination* were tested. In the other school, the largest of the nineteen, only two-thirds of the number available were taken, to avoid overweighting the results by including too many children from the few large schools. The number of absentees, leavers before the date of testing, exclusions, etc., reduced the total to 327 children actually tested, being 37 per cent. of the possible number in the country.

The second group—partially sighted children in Public Elementary Schools—should similarly have been selected from a wide choice of areas, but this was not found possible since (i) most

* One school of 1 class had been in existence only 2 years 10 months. Its children were, however, included if they had been in attendance from the opening.

Any child who was known to be mentally defective, or who could not read sufficiently to answer the easiest question on the English test, was excluded. There were eight of these children in the Special Schools Group and three in the Public Elementary School Group of partially sighted children. Only one of these 11 was excluded on grounds of sight alone. She was about to be transferred to a school for the blind.

urban areas sufficiently large to provide a group of children for testing already have a special school; (ii) in other areas children are so scattered in various schools, towns and villages that assembly into groups for testing is a matter of great cost and administrative difficulty. All the children in this group, therefore, were drawn from one large urban area which has no special school for the partially sighted. Their names were taken from a roll of names of children selected by the School Medical Officer as being suitable for special education if any had been provided. The small number (51) which it was found possible to test makes conclusions drawn from the results of this group somewhat unreliable.

As it was early found that the special school children were as a group, slightly below average in intelligence, and, in the opinion of teachers and others who had to do with them, in social class, a Public Elementary School was selected where the children were of a rather poor class socially and where 50 per cent. of the children had been creamed off at 11 + by examination,* leaving a group of fully sighted children which, it was thought, would be fairly comparable in intelligence with the Special Schools Group. It consisted of 168 children.

The selection of a small group of children to represent all elementary school children of a certain type is one of very great difficulty, and it is freely admitted that exception may be taken to the choice of one school of two departments (boys and girls) as representative. It will be shown (Section 6) that in average intelligence the groups *are* comparable, though the Special Schools Group contains more very bright and more very dull children. In the opinion of H.M. Inspector the school is efficiently run, contains a rather poor class of child and has been creamed of its brighter children.

4. *Administration of the Tests.*

Although all the tests used are in standard form with directions for use which would yield comparable results in the hands of different examiners, it was felt that more reliable results might be obtained if one person gave all the tests. All the examining and correcting were, therefore, done by the investigator, except that the class teacher or head teacher, with whose voice the children were familiar, gave the spelling test in the investigator's presence.

As the testing occupied less than three months it was not thought necessary to make any allowance for the time of year at which the tests were given. Ages were taken as on the day of examination since the two tests—of education and intelligence—were given either the same day or within a week, except in one school where the Easter Holiday intervened. The general procedure was for the arithmetic tests to be given from 9.45 to 10.45 a.m. and the English from 11 to 12 a.m. after a break for play. The intelligence tests

* The 10 year old children in this group had sat the examination but the results were not to hand. The teachers selected those children who, they thought, would pass, and excluded them from the group to be tested.

were given the same afternoon, and, in the larger schools, on the following days also, if necessary.

As at certain schools the children are accustomed to use crayons so thick that they would obscure the print, while thinner crayon pencils are used at others, each partially sighted child was provided with a B.B. marking pencil to make conditions at least objectively similar in all schools. As very little writing was necessary in any but the spelling test, where there was no time limit, it is unlikely that facility in writing influenced results appreciably.

It cannot be shown specifically that the tests were equally fair to all the children, but at least there is no evidence that they were manifestly unfair. If all the special school children were not accustomed to reading print as small as 24 point in school, there is no doubt that the majority were accustomed to reading far smaller print at home. Any strangeness they may have felt would be offset by the astonishment of the fully sighted children at the largeness of the print. In practice it was found that only the dullest children in any school had difficulty in understanding what to do, and a quiet word of explanation usually set them working at once.

Part II.—Findings.

5. Numbers and Ages of Children.

The numbers and ages of the children tested are given in Table I.

Group I is the Special Schools Group of partially sighted children.

Group II is the Public Elementary Schools Group of partially sighted children.

Group III is the Public Elementary Schools Group of fully sighted children.

TABLE I.
Numbers and Ages of all Children Tested.

Age.	Group I.			Group II.			Group III.		
	B.	G.	Total.	B.	G.	Total.	B.	G.	Total.
10-11	26	16	42	6	6	12	18	21	39
11-12	41	25	66	6	6	12	21	15	36
12-13	36	50	86	9	7	16	30	16	46
13-14	48	53	101	5	6	11	18	29	47
14-16	13	19	32	—	—	—	—	—	—
Totals ...	164	163	327	26	25	51	87	81	168

Age on Admission.

It will be noted in Table I that the numbers of boys and girls are equal in the partially sighted groups. As the children were chosen strictly in accordance with the procedure set out above (Section 3), it might be taken that the numbers in the schools as a whole would be approximately equal, though this would not be

true of individual schools: as a matter of fact the school registers over the whole country show a preponderance of girls, the proportion in the year ending 31st March, 1933, being 125 girls to 100 boys.

In the Special Schools Group the numbers rise rapidly with age showing that—unless the admissions have been falling, which is not the case—many children are admitted after their 8th or 9th birthday. Compared with the 13-year-olds the small number of 10-year-olds who have been three years or more in a special school implies that less than half of the former have been sent before their 8th birthday. This point may be made still clearer by examination of the ages of all the children on roll of the 19 special schools from which children were tested, given in Table II.

TABLE II.

Ages of all children on roll of 19 Special Schools for Partially Sighted Children from which children were selected for testing.

Ages on 31st March, 1933.

Age No.	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	Over 14	Total.
	4	11	49	62	102	123	143	167	158	69	888

As it is exceptional for a child to leave a special school to return to a Public Elementary School the 12-13 group may perhaps be swollen by the high birth-rate of 1920. On the other hand, it may be a chance fluctuation. The small number over 14 is caused by the practice of many Authorities of allowing children to leave at 14.

Of the 660 children aged 10 or over only about 385* (57 per cent.) had been in attendance for three or more years. Even of the 13 year old group only about 120† out of 158 (76 per cent.) had attended for three years, while of the tens only about 50‡ out of 123 (41 per cent.) had attended so long. It may in general terms be said that *less than half the children of 10 now in special schools, and only about three quarters of the children of 13 have enjoyed the advantages of special education for three years or more.* Assuming further that Table II represents a state of affairs which has been constant for some time—and there is no reason to believe that great changes in the age of admission have taken place—the inference may be drawn that *about half the children who have entered the special schools in the last few years have done so after their ninth birthday.*

6. Intelligence of Children by Groups.

When comparing groups of children in attainment it is necessary also to compare their intelligence, in order to determine whether or not any differences found may be attributed to this factor alone.

* 385 = 327 (No. of children over 10 who had been 3 years or more in attendance at a special school, see Table I) + 10 per cent. for absences + 24 for children omitted from the large school (Section 3).

† 120 = 101 + 10 per cent. for absences + 8 from the large school.

‡ 50 = 42 + 10 per cent. for absences + 4 from the large school.

The Mean*, Probable Error (P.E.), Standard Deviation and Total Range of the Intelligence Quotients of the three main groups of children are given in Table III.

TABLE III.

Mean Intelligence Quotients of the Three Groups of Children.

	Group I.	Group II.	Group III.
Mean I.Q.	92.7	93.9	94.4
P.E. of Mean	0.92	1.83	0.69
Standard Deviation	15.1	11.5	10.3
Total Range	55-140	66-106	72-127
No. of Children	123	18	100

The difference between the Mean I.Q. of Group I (the Special Schools Group) and that of Group II (the Partially Sighted Children in Public Elementary Schools) is 1.2 points. The P.E. of this difference is 2.04. The difference is not statistically significant as it does not exceed $3\frac{1}{2}$ times its P.E.

The difference between the Mean I.Q. of Group I and that of Group III (the normal Public Elementary School children) is 1.7 points. The P.E. of this difference is 1.15. The difference is therefore not significant.

It may thus be taken that there is *no significant difference* among the groups in their average intelligence, which is rather to the lower end of the range of normal children. As was stated in Section 3 dealing with the selection of the normal children, the Public Elementary School Group, though normal in eyesight, is not to be taken to represent "average" children for it had been "creamed" of its brightest pupils. In this and all subsequent comparisons with the partially sighted it must be remembered that the latter are being compared with Public Elementary School children equivalent in intelligence, but not up to the normal for the country as a whole.

The spread of I.Qs. as shown by the Standard Deviation and Total Range is very different, as might be expected. The Special Schools Group has an almost normal spread of I.Q. with some very clever children and others probably mentally defective. (Six out of the 123 tested had I.Qs. below 70 in spite of the fact that teachers had excluded seven children because of low mentality.) It would appear that in Group II had been included none of the bright children who could get on well in the elementary schools, and few very dull ones, who would presumably be in M.D. Schools: it is a group of children fairly close to the average. Group III contains only 6 children with I.Q. over 110 and 28 over 100 (out of 100 cases). In a normal group one would expect 25 and 50 respectively. The lower part of the distribution is fairly normal, but because of creaming there are few bright children. If the children below 75 I.Q. and those above 115 were excluded, the distributions of Groups I and III would be very similar in character.

* For explanation of the statistical terms used reference should be made to Note II at the end of this Appendix.

It may be asked whether it is certain that the children whose intelligence was tested are a proper sample of the whole. It has been stated that they were chosen at random, but to confirm this a comparison was made between the arithmetic scores of children tested and those not tested, and no significant difference was found.

7. Attainments of the Children by Groups.

It has been shown that the three Groups previously considered were equal in average intelligence: Table IV shows their scores on the Arithmetic and English Tests.

TABLE IV.

Mean scores, by Age, Sex, and Group, in Arithmetic and English, of all children tested. Numbers in brackets denote Probable Errors of the Means they follow. Standard Deviations are not stated for each age separately as they are approximately equal in each Group. (Maximum possible scores: Arithmetic 183; English 176.)

I.—Special Schools Group.

Arithmetic.				English.			
Age.	Boys.	Girls.	Total.	Age.	Boys.	Girls.	Total.
10-11	72.5	80.4	76.4 (3.11)	10-11	66.0	67.1	66.9 (2.71)
11-12	74.9	76.4	75.6 (2.28)	11-12	65.4	66.0	66.1 (2.40)
12-13	93.6	87.3	90.5 (2.22)	12-13	80.2	72.1	75.9 (2.38)
13-14	96.8	90.0	93.8 (2.20)	13-14	80.5	70.8	76.0 (2.18)
14 and over.	88.9	101.1	96.1	14 and over.	79.0	76.3	77.4
(S.D. about 30.)				(S.D. about 30.)			

II.—Partially Sighted Children in Public Elementary Schools.

Arithmetic.				English.			
Age.	Boys.	Girls.	Total.	Age.	Boys.	Girls.	Total.
10-11	60.2	92.0	76.1	10-11	61.5	77.7	69.6
11-12	91.5	82.5	87.0	11-12	91.3	76.2	83.8
12-13	103.3	81.7	93.8	12-13	103.9	83.0	94.8
13-14	116.0	98.8	106.6	13-14	118.4	99.7	108.2
(S.D. about 30.)				(S.D. about 30.)			

III. Fully Sighted Children in Public Elementary Schools.

Arithmetic.				English.			
Age.	Boys.	Girls.	Total.	Age.	Boys.	Girls.	Total.
10-11	71.9	75.0	73.6 (2.31)	10-11	82.3	74.8	78.9 (2.08)
11-12	78.0	93.3	84.7 (1.94)	11-12	77.7	76.4	77.2 (2.25)
12-13	86.4	86.2	86.3 (2.29)	12-13	87.5	81.7	86.3 (2.14)
13-14	101.0	86.5	92.5 (2.01)	13-14	103.4	95.9	99.7 (1.69)
(S.D. about 20.)				(S.D. about 20.)			

Several points should be noted :—

(a) No reliance should be placed upon differences between boys and girls as the numbers are so small that the differences are not significant. (For numbers see Table I.)

(b) In Arithmetic the scores obtained differ so little from each other—age for age—that it must be concluded that the Arithmetical abilities of the three Groups are equal—*that is say, the partially sighted children both in Special and Public Elementary Schools, are equal in the types of Arithmetic tested to normally sighted Public Elementary School children of equivalent though somewhat below average intelligence.* (To be significant any difference would require to exceed about 10 points between Groups I and III and 20 in comparisons with Group II.) (See Note on Statistical Terms.)

(c) In English the differences are much greater, and approach the magnitude required for statistical significance. All the differences between Groups I and III exceed 3 times their Probable Error, which indicates that the odds are at least 46 to 1 that they are not due to chance factors only. The 10 year difference exceeds $3\frac{1}{2}$ times its P.E. while the 13 year difference exceeds 8 times its P.E., making it practically certain that the differences are real. That is to say, the tests show that *in the English subjects the special school children are inferior to fully sighted Public Elementary School children of equal though somewhat below average intelligence*: by how much it is difficult to say without further data. It may, however, be noted that the 10-year-old fully sighted children make a higher average score than the 13-year-old special school children.

The differences between Groups I and II—age for age—should approach 20 before they become statistically significant, owing to the small number in Group II. There is no appreciable difference at the age of 10; at 11 and 12 the difference approaches significance; while the difference at 13 is definitely significant. That is to say, *at the age of 10 the partially sighted children in special schools are on a par, as regards English, with those in Public Elementary Schools, but as time goes on they fall more and more behind*, making less progress in three years than those in Public Elementary Schools do in one. (But see also § 9 and Table VIII.)

The differences between Groups II and III are nowhere significant.

(d) The spread of scores in Group I is as great again as that in Group III as shown by the Standard Deviations of approximately 30 and 20 respectively. This accords with the difference in spread of intelligence (S.D. 15 and 10 respectively). Because of the small numbers it is difficult to assess a measure of scatter for Group II. A Standard Deviation of 30 has been used in calculating rough Probable Errors for this Group.

(e) The increase in score from one age group to the next is by no means uniform in any Group, and with small numbers this would not be expected, but there are several places in Table IV which invite comment. In Group III English, the 10-year-olds do better than the elevens. This appears to be due to a superiority to the elevens on the part of the 10-year-old *boys* only. As they do not show this in Arithmetic also, it may be put down to a chance difference rather than a real one, and need not be considered further. In Group I, however, the peculiarities are constant between Arithmetic and English: *the tens do as well as the elevens, and the twelves as the thirteens*. Many reasons might be adduced for this curious state of affairs. One is that the elevens and thirteens were particularly dull compared with the tens and twelves. On an analysis of the mental ages of those children whose intelligence was tested it turns out that the thirteens have an average M.A. no greater than the twelves, but that the elevens are ahead of the tens. This explains the poorer score of the thirteens, but another explanation must be found for the inferiority of the elevens if it is not to be put down to the chance factors which operate so heavily in experimentation with small numbers. It is tentatively suggested that it may be due to a characteristic of the special schools, namely, their small size. Promotion to the top class usually takes place between 11 and 12. Some of the elevens who are working with children of 10 and younger are finding things fairly easy as the teacher has to adapt her teaching to the younger children, and are not being made to do their best. Others have been promoted to the top class and have not yet accustomed themselves to the more advanced style of teaching they find there. Neither group is working as it should. These difficulties of teaching many ages in one class, and of promotion from one class to another, are always emphasised by teachers, and it is reasonable to suppose that they might exert an influence upon the attainments of the children.

(f) From the statistician's point of view the tests appear to "work" well, as they spread the scores over a large range and show no "lumping" of scores at either the upper or the lower end. No child made within 10 marks of the maximum score, and only one made less than 10 marks on either test. (Maxima: Arithmetic 183; English, 176.)

8. *The Performance of Partially and Normally Sighted Children in different subjects of the curriculum.*

No analysis of performance in the various departments of Arithmetic was made since it has been shown that the special school children were practically equal to normally sighted elementary school children in that subject, but since in English they were to some extent inferior it was felt that light might be cast on certain difficulties of the special schools if the English sub-tests were analysed separately. (For content of each Sub-Test see Section 2.)

A figure had to be found which would represent the comparative ability of two of the groups of children for each sub-test separately. The mean score of all the children in each Group would not answer the purpose, as the groups were of unequal composition, e.g., in the Special Schools Group there were twice as many 13-year-olds as tens, while in the Public Elementary School normally sighted Group the numbers at each age were more or less equal. The mean of the year-averages for boys and girls separately was chosen, and in Table V these means stand for the marks of the theoretical average child of each group.

TABLE V.

*Analysis of English Test Scores.**Mean Scores made by Different Groups on English Sub-Tests (the Groups being equated for age and sex).*

Sub-Test.	1	2	3	4	5	6	7	Total.
1. S.S. Group ...	12·6	8·5	9·6	7·1	12·7	9·8	10·7	71·0
2. P.S. Childn. in P.E.S.	15·0	10·6	12·0	8·5	16·1	15·2	11·7	89·0
3. P.E.S. Children ...	13·4	9·6	12·0	8·2	16·2	14·0	11·6	85·0

Thus the average partially sighted child in a special school makes a total of 71 marks: the average partially sighted child in a Public Elementary School 89 marks. To compare their totals and their marks on each sub-test separately, each mark of the average special school child was divided in turn by the corresponding mark of the average child in the other group, and turned into a percentage. These are given in Table VI.

TABLE VI.

Ratios of Scores made by Special Schools Group on English Sub-Tests to corresponding Scores of the other Groups.

Sub-Test.	1	2	3	4	5	6	7	Total.
S.S. Gp./P.S. Chn. in P.E.S.	84·4	80·0	80·2	83·8	78·8	64·6	91·6	79·8
S.S. Gp./P.E.S. Chn. ...	94·3	87·9	79·8	86·6	78·6	70·2	92·0	83·5

Table VI reads "On sub-test I, the Special Schools Group made 84·4 per cent. of the marks the partially sighted children in Public Elementary Schools made," and so on. Where the ratio of marks is highest, the special school children do relatively well: where lowest, relatively badly. The relative positions of the sub-tests in the two lines of comparison are almost the same: Nos. 1 and 7 come at the top, Nos. 5 and 6 at the bottom, with Nos. 2, 3 and 4 between. Since the number of children in the comparison with the partially sighted children in Public Elementary Schools is the smaller and the figures less reliable, only the comparison with normally sighted Public Elementary School children is discussed in detail.

There is no sub-test where the special school children do as well as the other group, the percentage ranging from 94 to 70, with an average for the whole Test of 83·5.

Test I is a test where intelligence weighs heavily, being of a type often used in Group Intelligence Scales. The questions are

of the form " Is it painful to greet a welcome guest? " and the answer has to be " Yes " or " No " or " I do not know ". The abilities tested are ability to read the words of the question and to understand exactly what has been read, with speed in doing so. No definite knowledge is required to answer the question if its meaning is understood. On this kind of test the special school children do almost as well as the normal children. That is to say, they have learned the mechanics of reading, and have been taught to grasp the meaning of a short question such as might be written on the blackboard or hand-printed on a large sheet. There is nothing in the methods of the special school to prevent their learning this, and they appear to have done so almost as well as the fully sighted children.

Test 7, the other test where they do relatively well, is Spelling. Special school teachers are apt to say that lack of reading causes their children to spell badly, but on this Test the spelling, if not exactly good, is almost as good as that of elementary school children of equal intelligence. Probably, realizing their children's handicap, teachers lay stress on the subject: they have no reason to feel dissatisfied with the result.

Tests 2, 3 and 4 which deal with other aspects of reading are not so well done by the special school children. Test 2 is purely on vocabulary: number of words known. It is natural that restricted reading should decrease this. Tests 3 and 4 deal with an aspect of reading which is peculiarly difficult to teach in the special schools, namely, ability to follow the thread of a narrative or argument in a passage of several sentences where failure to grasp details means total lack of understanding. Most of the reading matter in use in these schools is designed to convey facts, not to give practice in elucidating a meaning which has to be sought for. There is a lack of *difficult enough* material for silent reading and questioning. Test 3 also tests grammatical usage, and Test 4 speed of reading.

Tests 5 and 6, which are done least well, by comparison, are geography and history, the teaching of which is seriously hampered in the special schools both by the entire lack of text-books and almost entire lack of maps and by difficulties of organisation due to the small size of most of the schools.

In short, *while the special school children do as well as the fully sighted children in none of the English sub-tests, they approach the normal most nearly in answering questions and spelling, are more backward in vocabulary and the other aspects of reading, and most of all in history and geography.*

9. *The Influence of Type of Defect and Visual Acuity upon Performance.*

So far the special school children have been dealt with as a group, as a sample of all the partially sighted children who are being specially educated, without regard to the nature of their defect or

the manner in which they are being provided for. The conclusions arrived at in the preceding paragraphs are true only of the group as a whole, not of any particular school or type of school, nor of children suffering from any particular type of eye defect; and show only how the whole group compares with other partially sighted children and with fully sighted children. The different types of child and school must now be considered separately.

The ophthalmic records of the special school children were examined, and note was taken of the diagnosis, the visual acuity with glasses, and, if glasses had been prescribed, the prescription. The record of retinoscopy was seldom given separately. Since few of the records indicated whether the glasses of the myopes gave full or only partial correction, the statement of the number of dioptres of myopia inferred cannot be regarded as accurate. No records were available for 10 children and from others certain particulars were missing.

The proportion of myopes varied from school to school: one had 100 per cent. myopes, 3 had 75 to 99 per cent., 11 had 50 to 74 per cent., 4 had 30 to 49 per cent. In the whole special schools group the percentage of myopes was 63. Among the partially sighted children in Public Elementary Schools the percentage of myopes was 84.

As it is commonly held in the special schools that the myopes are a more intelligent type than the non-myopes, who suffer from a variety of defects some of which are associated with hereditary diseases, a comparison was made between the attainments of those children who were suffering from myopia alone and those whose defect was other than myopia. The children (22 in number) who suffered from myopia with the addition of some other defect were not included in this comparison. To find whether the higher degrees of myopia interfered to a greater extent with education than the lower, the myopes were divided into two groups, the high myopes, with 10 or more dioptres of myopia in the worse eye, and the low myopes, with less. The figures upon which to base comparisons are given in Table VII.

TABLE VII.

Special Schools Group: Mean Scores in English and Arithmetic by type of defect. Probable Errors of Means given in brackets.

	Low Myopes.	High Myopes.	All Myopes.	Non-Myopes.
Arithmetic ...	92.4 (2.10)	88.5 (2.14)	90.7 (1.51)	78.9 (2.18)
English ...	81.1 (1.85)	77.6 (2.24)	79.6 (1.44)	57.5 (2.00)
No. of children	117	89	206	89

(Standard Deviations approximately 30.)

The differences between the low and high myopes are so small as to be statistically insignificant. (P.E. of the differences: Arithmetic 3.00: English 2.91). The differences between the myopes and the non-myopes are definitely significant (P.E. of the differences: Arithmetic 2.65: English 2.46).

That is to say, the degree of myopia does not appear to affect significantly the attainments of the myope, but the myope scores significantly more than the non-myope, particularly in English.

Is this difference due to a difference in intelligence or to a difference in visual acuity, or both? The average intelligence quotient and, in case there should be a difference in age, the average mental ages (M.A.) of the myopes and non-myopes are given in Table VIII.

TABLE VIII.

Special Schools Group: Mean I.Q. and M.A. of Myopes and Non-Myopes. Probable Errors given in brackets.

	All Myopes.	Non-Myopes.	Difference of Means.
Mean I.Q. ...	96.3 (1.22)	86.2 (1.28)	10.1 (1.77)
Mean M.A. ...	11 yrs. 9.8 m. (1.8 m.)	10 yrs. 9.9 m. (2.1 m.)	11.9 m. (2.8 m.)
No. of children	76	34	

As the differences exceed $3\frac{1}{2}$ times their P.E. they are significant; that is to say, *there is a significant difference in intelligence between myopes and non-myopes of no less than 10 points of I.Q. and nearly a year in mental age.* It is therefore impossible to expect as great attainments from the non-myopes as from the myopes. It might still be, however, that the poor sight of the non-myopes was partly responsible for their poorer performance, and to cast light on this all the children were divided into two groups according as their visual acuity (with glasses) was 6/24 or better on the one hand, or worse than 6/24 on the other. These groups may be called those with Good and Poor Sight, using "good" in a relative sense. Table IX gives the attainment and intelligence scores of these groups.

TABLE IX.

Special Schools Group: Mean Score and I.Q. of Children with Good and Poor Sight. (Good means 6/24 or better.) Probable Errors given in brackets.

	Good sight.	Poor sight.	Difference of Means.
a. Arithmetic ...	90.2 (1.33)	71.1 (2.63)	19.1 (2.95)
b. English ...	76.4 (1.28)	53.6 (2.60)	22.8 (2.90)
c. Intelligence ...	93.3 (1.09)	88.8 (1.70)	4.5 (2.02)
No. of children in a and b	261	49	
No. of children in c	96	20	

The differences in Arithmetic and English are very large and significant: the difference in Intelligence is small and not significant. That is to say, *the children with poor sight do much less well than those with good sight, but evidently not because of any difference in intelligence.* Although the children with poor sight tend to be in the non-myopic group it would be a mistake to identify the non-myopic group with the poor sight group. Not only is the latter just half as large as the non-myopic group (49 against 89) but eleven of its number are myopes. *The handicap of the non-myope is therefore due both to lower intelligence and poorer sight,* but poor sight in itself, though it goes with poor work, is not connected with low intelligence.

Since a significant difference in ability has been found between myopes and non-myopes (Table VIII) it is necessary to guard against making generalizations falsified by the action of this factor. If a group of partially sighted children contains a large proportion of myopes it may be expected to do well, other things being equal.

It will therefore be necessary to return to the original groups of partially sighted children in Special Schools and in Public Elementary Schools and to compare the myopes only in them, as the group which did better had the larger proportion of myopes and may have succeeded on that account. In Table X are given the scores in English and Arithmetic for myopes only.

TABLE X.

Mean Scores in Arithmetic and English of all Myopes in the Special and Public Elementary Schools Groups. P.E. of Means of Special Schools Group in brackets: those of the Public Elementary School group vary from 5 to 6½.

Group I.—Myopes only in Special Schools Group.

Age.		Arithmetic.	English.	No. of Children.
10-11	... ..	78.1 (3.32)	71.0 (3.01)	35
11-12	... ..	79.7 (2.62)	75.0 (3.02)	43
12-13	... ..	97.0 (2.80)	82.1 (3.00)	51
13-14	... ..	100.8 (2.83)	85.8 (2.70)	62

S.D. about 30.

Group II.—Myopes only in Public Elementary Schools Group.

Age.		Arithmetic.	English.	No. of Children.
10-11	... ..	73.4	69.2	9
11-12	... ..	98.4	92.1	8
12-13	... ..	93.8	94.8	16
13-14	... ..	104.0	103.6	10

S.D. about 30.

If this Table is compared with Table IV which gives the same information for the whole group (myopes and non-myopes together) it will be noted that the differences between the scores of Group I and Group II have decreased. The partially sighted children in Public Elementary Schools do not have so great an advantage over those in special schools when myopes only are taken. In Arithmetic the scores remain fairly similar; in English, while the elementary schools group stands still the special schools group advances from 6 to 10 points. The probable errors for so small a group as Group II must needs be only approximately correct, but such as they are, they indicate that differences of 20 to 24 points between the groups would be necessary to ensure statistical significance. As such differences are not forthcoming it is not advisable to draw the definite conclusion that the one group is superior to the other. On the other hand the odds are about 10 to 1 that between 11 and 14 the elementary school myopes are superior.

There is, however, sufficient evidence to modify the statement made at the end of Section 7 (c) that the special school children made less progress in English in three years than partially sighted children in elementary schools did in one, by adding that when myopes only were taken *the special school children over a period of three years made half the progress the elementary school children made.* Otherwise no change need be made in the deductions drawn in Section 7.

10. *The Effect of Size and Type of Special School upon the Performance of Partially Sighted Children.*

It might naturally be thought that better classification and organisation would show definite advantages for the larger schools, and that a comparison between the scores of children in schools of different sizes would produce evidence of this. Yet it was realised that the small number of schools of each size, the differences in standards of selection of children from school to school, and the effects of good and bad teaching in schools of each type might mask differences due to size alone. The inconclusive results shown in Table XI show that this has been the case.

TABLE XI.

Special Schools Group: Mean Scores in Arithmetic and English of Children by Size of School.

Size of School.	Arithmetic.	English.	Number of Children.	Number of Schools.
1 class	87·6	78·0	42	5
2 classes	89·3	73·3	125	9
3 „	80·2	66·9	78	3
4 or more classes...	93·6	73·5	82	2

No differences are significant except those between the 3 class schools and the 4 or more class schools, and *no generalization can be drawn as to the influence of size upon efficiency*. No further light is shed by taking the myopes only in each group.

The special schools differ in other respects besides size. Certain of them are attached to a Public Elementary School in which the children, or some of them, are for certain periods taught along with the elementary school children: the children are not segregated from their normally sighted fellows.* The majority however are entirely separate from any Public Elementary School. A comparison was made between all the children in these two types of school, and also between the myopes only in the two types.

TABLE XII.

Special Schools Group: Mean Scores of Children in Segregated and Non-Segregated Schools.

			Segregated.	Non-Segregated.	Difference.
Arithmetic—	All children	... ..	91·5	74·0	17·5
	Myopes only	... ..	91·8	79·4	12·4
English—	All children	... ..	73·5	64·3	9·2
	Myopes only	... ..	80·1	74·4	5·7
Number—	All children	... ..	285	42	
	Myopes only	... ..	188	18	

The segregated schools appear to do better than the non-segregated, but as the latter number only four the probability of chance selection interfering with the results is high. The difference (for "all children") in Arithmetic is significant—over 5 times its P.E.—and that for English is also significant—3·9 times its P.E. For the myopes only however the difference in Arithmetic is not significant—1·7 times its P.E.—and in English is certainly not significant—1·1 times its P.E. It can therefore be said that *while there is a probability that the segregated schools do better than the non-segregated, the numbers are too small to make the evidence conclusive*.

11. *The Effect of Restrictive Special Methods on the Performance of Partially Sighted Children.*

The principal restrictions imposed by ophthalmic advisers upon the methods in Arithmetic and English are the prohibition of printed matter under $\frac{3}{4}$ inch body and the use of paper and pencil or pen for writing. In dividing schools into one or other of the two categories "More" and "Less" Restricted only the former

* See Chapter V of the Committee's Report.

has been taken into account, since, if print is allowed, it may be taken for granted that other restrictions will not be severe. If American "Clear Type" books or ordinary primers are used, for however short a period, the school is classed as "Less Restricted." Table XIII gives the figures for comparisons between all children and myopes only in these types of school.

TABLE XIII.

Special Schools Group: Mean Scores of Children in Schools which are More or Less restricted in Methods.

Type of School.	More Restricted.		Less Restricted.		Difference.	
	All Children.	Myopes.	All Children.	Myopes.	All Children.	Myopes.
Arithmetic	93·1	91·3	82·3	89·1	10·8	2·2
English	73·9	78·7	69·4	81·6	4·5	-2·9
No. of Children	220	147	107	59	—	—

It appears at first sight as if the schools where books are forbidden are at an advantage! Their scores are higher, though only the Arithmetic yields a significant difference (4·5 times its P.E. of 2·4). The advantage is only apparent, however, due to the larger proportion of myopes in the more restricted schools (67 per cent. against 55 per cent.). When the myopes only are taken it is evident that *there is little or no difference to be found between the attainments in the more and the less restricted schools*, for, while the more restricted schools remain somewhat advanced in Arithmetic, and the less restricted schools are slightly in the lead in English, neither lead is large enough to be significant, the P.E. of the differences being about 3. It is not perhaps surprising that the more restricted group should do as well as the other in Arithmetic, because books are not so essential in that subject, but in English one would expect a real difference in favour of the group where books are used, and its absence calls for explanation.

It might be that the number of "Clear Type" and other books available in the schools is so small, and the amount of time devoted to the reading of them is so short that they make little or no difference to the effect of instruction in these schools. This may be so: it is undeniable that books are scarce and expensive; but the amount of printing in a single "Clear Type" book is as great as the total available hand-printed matter in many a more restricted school; and in the schools where books are used all the resources of the more restricted schools are at hand in addition. One would prefer something more convincing. Another possible explanation may be found in the influence of the ophthalmic

surgeons not only in settling restrictions, but in selecting children for admission. A man who regards the child's *education* as so important that he will permit printed books in his special school is likely to leave in the elementary school any child who can possibly succeed there without serious danger to his eyes, and so to deprive his special school of some of its brighter pupils. In other places, where the child's education is more subordinated to care for his eyes, not only will print be prohibited, but brighter children who are apparently getting on fairly well in the elementary school will be admitted to the special school in greater numbers. There is thus a presupposition that where restrictions are few the children will be a more closely selected group, with fewer bright ones among them. It is known that the ophthalmic surgeons in charge of at least 3 of the 6 schools with few restrictions undoubtedly select in this way, and the next Table (Table XIV) gives figures which, though not themselves statistically significant are, when taken with this outside knowledge, evidence that few restrictions and a slightly lower grade of child go together.

TABLE XIV.

Special Schools Group: Intelligence of Myopes in the More and Less Restricted Schools.

	More Restricted.	Less Restricted.	Difference with P.E.
Mean I.Q.	97·8	92·9	4·9 (1·77)
Mean M.A.	11 y. 11·8 m.	11 y. 5·3 m.	6·5 m. (2·8)
Percentage of Children of 105 I.Q. and over.	34 per cent.	17 per cent.	17 per cent.
No. of Children	53	23	—

The difference in I.Q. is 2·8 times its P.E.; in M.A. 2·3 times its P.E. Neither is large enough to be entirely free from the element of chance, but it is at least 15 to 1 in favour of the differences being real.

If, therefore, the myopes of the schools in which books are used seem both by the practice of the surgeons and by the test results to be somewhat less intelligent than those of the other schools and yet to make at least equal scores in the English tests *there is*, if not certainty, at least a *fair presumption that the use of books has aided their instruction in English*. On the other hand, it is also true, that, if the loosening of restrictions by the introduction of books to the extent that is now allowed in these schools has had any effect in aiding the instruction in English, the effect has been small. More than that cannot be said: the number of schools and children is too small to eliminate the effect of chance factors, which might be responsible for the test results.

12. *Summary of Conclusions.*

1. A representative selection of children in special schools for the partially sighted was compared in the fundamentals of Arithmetic and English with a group of partially sighted children in Public Elementary Schools and with a group of normally sighted children of the same level of intelligence in Public Elementary Schools.

2. Less than half the children of ten now in special schools and only about three-quarters of the children of thirteen have enjoyed the advantages of special education for three years or more.

3. The special school children were found to be approximately equal in arithmetical attainments to those in the other groups.

4. In the English subjects the special school children are inferior to fully sighted children of the same level of intelligence, ten year old fully sighted children making a better score than thirteen year old special school children. At the age of ten the special school children are on a par as regards English ability with partially sighted children in elementary schools but as time goes on they fall farther and farther behind, the special school children over a period of three years making only half the progress the elementary school children make.

5. While the special school children do not score as highly as the fully sighted children in any of the branches of English tested, they approach the normal most nearly in answering questions and in spelling, are more backward in vocabulary and other aspects of reading, and most of all in geography and history.

6. The degree of myopia does not appear to affect significantly the attainments of the myopes, but the myopes score significantly more than the non-myopes, particularly in English.

7. Poor sight and poor attainments go together but the intelligence is not affected by poor sight.

8. No generalization can be drawn as to the influence of size of school on efficiency.

9. While the children in segregated special schools appear to do better than those in non-segregated schools the numbers are too small to make the evidence conclusive.

10. Though the degree of restriction placed upon reading in the special schools by their ophthalmic advisers appears to affect the attainments in English but little, there is evidence to justify at least a presumption that where books are allowed they aid the instruction.

NOTE I.

Note on the Binet Test used for Partially Sighted Children.

The Stanford Revision of the Binet Scale as revised for use in British Schools was used with the following modifications:—

(a) Certain items were omitted, as follows:—

Year VI.—No. 2—Incomplete faces.

Year VII.—No. 2—Description of pictures.

- Year X.—No. 4—Reading passage.
 Year XII.—No. 4—Mixed sentences.
 7—Interpretation of pictures.
 Year XIV.—No. 3—President and King.
 5—Arithmetical Problems read.
 Av. Adult No. 4—Boxes.
 6—Code.

(b) For those in Years VI, VII, X and Av. Adult the alternative tests were used, the scoring being as usual. In Year XII only six tests were left, and the scoring was four months for each. In Year XIV only five tests (including the alternative) were available. They were scored 4·8 months for each.

NOTE II.

Note on Statistical Terms Employed.

The statistical terms most commonly used in this Appendix are Mean, Standard Deviation, and Probable Error.

(1) *The Mean* is the average: the sum of the scores made by a group of children divided by the number of scores.

(2) *The Standard Deviation* (S.D.) is a measure of dispersion or scatter, and is used to indicate whether the scores of a group are spread widely over a large range or cluster closely about the mean. It shows how widely members of a group vary among themselves. It is calculated by taking the square root of the mean of the squares of the deviations of the individual scores from the mean of the group.

(3) *The Probable Error* (P.E.) of a mean or of a difference is a measure of the degree to which it may be affected by the chance factors operating in the selection of a sample to represent a larger group. The means of two or more samples taken from any one group of children are likely to differ to some extent by chance, no matter how carefully the samples are selected, and none of these sample means can be taken as the "true" mean of the whole group. If only one sample is taken it is desirable to know to what extent the "true" mean is likely to differ from that of the sample. The P.E. of the mean indicates the limits within which the "true" mean may be expected by the laws of probability to vary from the mean of the sample. The chances are 1:1 (even) that the "true" mean will lie between the sample mean plus the P.E. and the sample mean minus the P.E. (i.e., $\text{Mean} \pm \text{P.E.}$). If the mean is 46 and its P.E. is 1·5 the chances are even that the "true" mean will lie between 44·5 and 47·5. The chances that the "true" mean will lie within ± 2 P.E. are 4·6 to 1; within ± 3 P.E. are 22 to 1; and within ± 4 P.E. are 142 to 1. Obviously one cannot assume that the "true" mean will lie within 1 P.E.

of the mean of the sample, and in practice it is taken that all that can be assumed with safety is that the "true" mean will lie within $3\frac{1}{2}$ P.E. of the mean of the sample. Even this is not *certain*, but the odds (54 to 1) are very large that it will.

In drawing deductions from the figures in the Report we wish to compare *all* partially sighted children with *all* elementary school children; but the most we can gather from the figures obtained by testing is a comparison between *the sample* of partially sighted children which was tested and *the sample* of elementary school children which was tested. We wish to know if inference from one to the other is legitimate. From the above paragraph it is clear that we cannot depend on a difference between the means of two samples being a "true" difference between the groups from which the samples were taken, unless it is large enough to make it probable that the difference has not been caused merely by taking samples which were not really representative, that is to say, by chance. If a difference is only as large as its P.E. the chances are only 3 to 1 that it is greater than zero, i.e., that there is a difference at all. If it is over 2 P.E. the chances are 10 to 1, if over 3 P.E. 46 to 1, if over 4 P.E. 285 to 1 that the difference is real. If the difference is less than $3\frac{1}{2}$ times its P.E. the chances are less than 109 to 1 that it is greater than zero. In practice this latter condition is indicated by saying that the difference is not statistically significant: in other words, whether there is any difference or not is too uncertain to build conclusions on. In the Report therefore little reliance has been placed on differences less than $3\frac{1}{2}$ times as large as their P.E. as they may be due to the effects of chance in sampling.

The P.E. of a mean is obtained by multiplying the S.D. by a constant (.6745) and dividing by the square root of the number of cases in the sample.

The P.E. of the difference between two means is given by the square root of the sum of the squares of the probable errors of the two means separately. (This is the case where the two sets of data are uncorrelated, as they are in this Report.)

APPENDIX G.

(a) *Some Notes on Research into the Legibility of Print.*

1. A great deal of research has been done on the work of the eye in reading and on the legibility of print. Useful bibliographies are contained in the Report by Mr. R. L. Pyke entitled "The Legibility of Print," 1926 (Special Report No. 110 of the Medical Research Council), and in Miss M. D. Vernon's book "The Experimental Study of Reading," Cambridge, 1931.

2. Research into the work of the eye in reading may be said to have begun with the work of Javal in 1879. The British Association for the Advancement of Science at their Dundee Meeting in 1912 appointed a Committee which made in 1912 a report on "School Books and Eyesight," and issued a revised report in 1913. Their report contains a useful appendix on technical terms which may be summarised as follows:—

Type body, type face, lateral shoulder, large face.

The letters are cast on a "type body." The part of the body which actually leaves its impress is the "face." When the "face" is nearly as large as the "body" will carry, the type is "large face." The space on the upper surface of the body on each side of the face is the "lateral shoulder." All one reads is the impress of the face of the type.

Serif.—A type in which each letter has only its bare necessary feature would be "without serif," the serif being the terminals of the letters. If of proper design, the serifs guide the eye from letter to letter and give a balanced effect, but in some styles they take the form of purposeless ornament.

Point.—"Point" is a unit of measurement. Unfortunately manufacturers do not agree precisely as to the size of "point" which they use. Approximately "1 point" equals $1/72$ of an inch. Thus an 18 point type has a *body* $\frac{1}{4}$ inch high. The face may be of any size smaller than the body. The bulk of this Report is printed in 11 point type.

Solid and leaded.—If the type of consecutive lines is set without vertical intervals between the bodies, the type is "solid." Where there is a vertical interval, say $1/36$ inch, the type is "2 point leaded." A large type face of 10 point body with "2 point leading" will produce about the same vertical space between the short letters as a small face type of 12 point printed "solid."

The Committee do not appear to have based their conclusions on actual experiment, but they make certain practical proposals. Printing should be in black ink evenly distributed over the whole page of non-glossy paper which should be slightly cream coloured. The type should be clean cut and well defined. Breadth is even more important than height. Contrast between finer and heavier

strokes should not be great for hair strokes are difficult to see. On the other hand, a very heavy face type suffers in legibility from diminution of the white interspace, e.g., where the space in the upper half of "e" is reduced to a white dot. In the ideal type it should be easy to discriminate between e, c and o, between i and l, and between h and k, and to recognise m, nm, nu, nv, w and in. Legibility is not increased by adding to the height of the letter without adding to its width. Long serifs should be avoided, and any extension of them sideways which forms or suggests a continuous line along the top or bottom is detrimental. The upper half of a word or letter is more important for perception than is the lower half, because the upper half of most letters has a more distinctive shape than the lower. In some recent type-faces the designers have shortened, e.g., the "p" and lengthened the "h." More experiment is desirable. The Committee were not prepared to recommend either "modern face" and "old face" to the exclusion of the other.

With regard to the size, as distinct from the shape of type, the Committee drew up the following table:—

Age of Reader.	Minimum height of face of short letters.	Minimum length of alphabet of small letters.	Minimum inter-linear space.	Maximum number of lines per 100 mm. or 4 inches.	Maximum length or measure of line.
Under 7 ...	3.5 mm.	96 mm.	6.5 mm.	10	—
7-8 ...	2.5 mm.	72 mm.	4.0 mm.	15	100 mm. or 4 in.
8-9 ...	2.0 mm.	55 mm.	2.9 mm.	20	93 mm. or 3 $\frac{3}{4}$ in.
9-12 ...	1.8 mm.	50 mm.	2.4 mm.	22	93 mm. or 3 $\frac{3}{4}$ in.
Over 12 ...	1.58 mm. or 1/16 in.	47 mm.	2.2 mm.	24	93 mm. or 3 $\frac{3}{4}$ in.

1 inch = 25.4 mm.

1 point = 1/72 inch = 0.35 mm.

Interlinear space means the vertical distance between the bottom of a short letter and the top of a short letter in the next line below. This space between the lines should vary in proportion to the size of type. Too little space is a source of fatigue owing to the difficulty of passing from the end of a line to the beginning of the one below. Very wide interlinear space has no advantage as regards legibility and involves waste of paper and increase in the size of the book.

The length of the line is important, for the longer it is, the greater the difficulty in passing from one line to the next. On the other hand, very short lines demand too frequent a change of direction in the movement of the eyes.

3. The above Report dealt with clear type for children of normal sight. In 1919-20 a report was published in Cleveland, Ohio, on "Large Type Reading Tests" for children with defective sight.

The tests were made with children over nine years of age and consisted in timing and recording their errors in reading 44 words arranged in 14 different orders and printed in 14 different styles of type. The Report concluded that sufficient but not too much space between the letters should be given, that the type should not be too large but should have a bold face and that 24 point type was preferred to 30 point type by most children. We understand that there is a growing tendency in "Sight Saving Classes" in the U.S.A. to prefer 18 point type. For the reasons stated below an experiment of this kind cannot be regarded as conclusive.

4. Research into the work of the eye in reading culminated in the studies of Buswell and others in the University of Chicago, 1920-22, when eye movements in reading were recorded photographically on a moving film and synchronised with dictaphone records of the reading voice. Experiment has shown that there are three main factors in reading :—

(a) the span of recognition, i.e., the amount of printed material which the eyes can grasp in a single span of attention or "fixation period." This span, except at the very beginning of learning to read, is always more than a single letter and may include several words. It varies greatly in different subjects;

(b) the rate of recognition, i.e., the duration of the fixation period or the time it takes the reader to assimilate the matter in a single span of attention; and

(c) the rhythmical progression of the eye along the line of print and of the returning sweep at the end of one line to the beginning of the next.

Each of these three can be measured objectively and accurately by Buswell's apparatus, but conclusions drawn for practical purposes from these objective measurements are subject to the considerations urged recently in the report of Mr. Pyke and the book of Miss Vernon referred to above.

5. In 1922, a Committee, appointed by the Treasury "to select the best faces of type and modes of display in Government Printing" made a report in which they suggested that the Medical Research Council should be asked to take up inquiries into the legibility of printed matter and optical properties of paper and ink. The Medical Research Council in 1923 set up a Committee on the Legibility of Type, of which Sir J. H. Parsons was chairman, which framed a scheme of investigation of which part was entrusted to Mr. R. L. Pyke, working in the Psychological Laboratory, Cambridge, under the direction of Mr. F. C. Bartlett. On the receipt of Mr. Pyke's Report, the Committee came to the conclusion that it was not advisable to continue the work on the same lines because they found that the experimental methods available were not likely to provide clear and direct answers to the many practical problems

remaining to be solved. The Medical Research Council then set up a Committee on the Physiology of Vision to carry out a more general and comprehensive scheme of research. They have since published "Studies in the Psychology of Reading" (a) the Errors made in Reading, by M. D. Vernon, and (b) three experiments on the Relation of Meaning to Perception in Reading, by R. W. Pickford (Report No. 130), and The Movements of the Eye in Reading, by M. D. Vernon (Report No. 148).

Mr. Pyke's conclusions may be summarised as follows:--

It is pretty generally agreed that the "ideal type" should be simple, fairly broad with fairly thick limbs, but not too much contrast in thickness and thinness, and with fairly wide spacing. Extremely large typographical differences must be present before it is possible to say that there is any difference in the objective legibility of types. Types more slightly differentiated will be legible according as they suit the psychological make-up of the reader. Hence the most legible type, in this subjective sense, is unlikely to be the same for all readers. These two ideas—that within limits there is no objective optimum, and that only extremely violent changes in the stimulus can produce any significant variation in the reaction—are found in other psycho-physiological fields, e.g., there is no one objectively best way of performing a manual operation. Again, the effect on mental activity and general behaviour of reduced oxygen pressure does not vary all along the scale in direct proportion to the reduction of oxygen. The effect is negligible, until the lack of oxygen is excessive, when the result is violent. There is then nothing intrinsically unlikely about this theory. It would explain why little agreement was obtained among the experimental results of subjects. Other influences make for this result. Three of the types used in the experiments were ordinary in appearance, the rest were unusual, and results indicate that to some extent it was its ordinariness which helped to make type 1 the best, a view psychologically not improbable. If it is correct, to isolate and test a type's objective legibility must be almost impossible.

Another factor which clogs the influence of objective legibility is the ease with which reading habits are established. The matter of controls is also difficult. Practical obstacles prevent controls being applied in many respects as rigidly as is desirable but in others absolute physical uniformity is a false condition which sacrifices the psychological uniformity, which is much more important, i.e., the conditions are more truly normal if every subject reads at the distance which suits him best than if all read at the same distance with their faces artificially clamped.

The problem of legibility seemed simple at the outset; it is in fact complex and elusive, and many questions have been raised which have not been answered. No scientific solution is possible until the manifold problems of method and technique have been acknowledged to exist and these have been solved. For this purpose are needed fewer opinions and more facts.

6. Miss Vernon in her book referred to above comes to very similar conclusions.

She says that investigation of the effects of typographical factors on reading involve some apparently fatal difficulties. The experimental situation is entirely different if you use groups of letters, nonsense words or disconnected words from the situation if you use connected and meaningful prose material because all the factors connected with the meaning and general significance of the context are absent in the

former. Moreover, the nature of the precept is quite different because individual letters are not separately perceived in normal reading as they must be in reading disconnected letters and nonsense words. It is unnecessary for individual words to be separately perceived in normal reading. Even the ocular motor habits are different in reading the two classes of material. Hence conclusions resulting from the use of the former kind of material are by no means valid when applied to the latter. If the latter kind of material is used it is almost impossible to select passages such that the effects of differences of meaning, familiarity and secondary thought processes will not far outweigh the experimentally introduced typographical differences. Even if the same paragraph is read twice over in different sizes of type, the reading situation by no means remains constant, because the subjective reaction of the reader will probably differ considerably in the first and second readings.

Miss Vernon considers that the best ultimate criterion of legibility would be the degree of fatigue produced by prolonged reading, but experimental conditions are difficult to control and we have no definite, accurate and extrinsic measure of fatigue, either ocular or general. One advantage of such a method, if it could be evolved, would be that the influence of variations in the reading performance, set up by the meaning of the content, would be minimised.

The most frequently employed criteria of legibility are speed of reading, accuracy of reading and eye movements. Speed of reading can be modified enormously by the attitude of the reader. Errors in normal reading are very few, usually due either to some mistake in the assimilated meaning or to errors of vocalisation. Only very extreme typographical changes, such as the use of type more than 36 point or less than 6 point in size or of a Gothic type face, affect the eye movements appreciably. The perceptual motor reading habits are so well established that they are unaffected by moderate changes of the perceptual stimulus.

Miss Vernon concludes that it is almost impossible to assess legibility from the reading of the mature reader, unless some test of cumulative fatigue is ultimately devised. Such limitations need not, however, apply to children's reading. Children pay more attention to the detailed structure of the perceptual stimulus and may even perceive letters individually. Their eyes are much more liable to fatigue and strain than those of an adult. Hence she considers that the criterion of legibility should be based on the reading of children. Type which is suitable for them will hold no difficulty for the adult, though certain modifications, such as reduction of size, may be found desirable.

(b) Specimens of Garamond Bold Type

(i) 14 point

the only mammal in all the world that actually flies. The so-called flying squirrel is merely a glider which can sail on outstretched membranes from a tree top to some lower elevation. It cannot really fly. Examined closely the bat seems to be closer kin to mice than to any other animals. It used to be called in England a flitter-mouse. It has a stocky, fur-covered body, with very strong chest muscles, since they must furnish the power for operating those big wings. But this weird animal has yet another quality, stranger than any of the rest, that is quite baffling even to the only mammal in all the world that actually flies. The so-called flying squirrel is merely a glider which can sail on outstretched membranes from a tree top to some lower elevation. It cannot really fly. Examined closely the bat seems to be closer kin to mice than to any other animals. It used to be called in England a flitter-mouse. It has a stocky, fur-covered body, with very strong chest muscles, since they must furnish the power for operating those big wings. But this weird animal has yet another quality, stranger than any of the rest, that is quite baffling even to the only mammal in all the world that actually flies. The

(ii) 18 point

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APPENDIX H.

Summary of Evidence on arrangements made in certain towns for Leaving School, finding Work and After-Care.*Bradford.*

All children leaving the Myope School are asked to return for ophthalmological re-examination every six months until they reach sixteen years of age. In practice most children do so. Of the 1931 leavers, 12 returned to ordinary schools, 25 became shop assistants, 42 mill hands, 8 errand boys and the remaining 11 entered various other occupations. School leavers have had little difficulty in finding work. The official agency for placing is a Juvenile Employment Bureau. An investigation of 150 ex-pupils of the Myope School showed that in 80 there was no further progression of the myopia, in 47 it had increased at a rate of one-quarter to one diopetre per annum, in 14 at the rate of 2 dioptres, and in the remaining 9, at a higher rate than 2. These figures were regarded as satisfactory in view of the number of children entering unsuitable occupations in the mills. In the Bradford School nearly all the children leave at 14. The rule is to permit children to leave at that age unless the defect is progressive, and unless there is a definite proposal to place the child in unsuitable work.

Liverpool.

Children usually stay to the age of 16, and leave earlier only with the approval of the Education Authority on the recommendation of the ophthalmic surgeon. In Liverpool the Juvenile Employment Bureau keeps in close touch with ex-pupils of the Defective Vision Classes up to the age of 18, whether they are in employment or not. There is no arrangement for periodical ophthalmological examination, but the Bureau frequently advises young persons in work to attend a clinic or a hospital for examination and advises them as to where glasses should be obtained. Such advice, well-intentioned as it is, can be effective only in so far as it induces the young persons concerned to put themselves in professional hands. In approaching employers on behalf of particular children, the Bureau reveals any facts of vision which are relevant to the suggested occupation.

The results of two sample surveys of ex-pupils were put at our disposal. One showed that of a total of 51 partially sighted children who had been registered at the Bureau in the period September, 1929, to June, 1932, 17 had been placed in employment by the Bureau and 11 had found employment by their own efforts; 4 had been placed under training by the Bureau; 18 were unemployed and 1 had been lost sight of. Of the 11 boys and girls who had found employment through their own efforts 3 were van boys or messengers, 3 labourers and 2 factory hands; of the girls, 1 was a factory hand, 1 an apprentice florist and 1 an apprentice leather

worker. The other sample is of the 21 school-leavers (13 boys and 8 girls) in the last two years. This shows that 16 had left at the age of 16, 4 at 15, and 1 at 14, making a total of 21. Of the 13 boys included in the sample, 3 had entered the Workshop for the Blind, 2 were messengers, 4 were "travellers on a small scale in toys, eggs and clothes," 1 was gardening and 1 was a page boy. Of the 8 girls, 2 were at home, 1 was in domestic service, 2 were engaged in lamp shade making; the other three were a florist's assistant, a waitress and a chandler's shop assistant.

A comparison of these two samples strongly suggests a tendency for the pupils to fall out of work after a year or two of employment. A rather high proportion became shop assistants, but the occupations taken are otherwise a representative sample of the rather lower grade "unregulated occupations" into which boys commonly go on leaving school. The occupations of the girls, on the other hand, are of rather better quality. It is worth noting that in Liverpool no attempt is made in the Defective Vision classes to give vocational training, although the choice of occupations is sometimes influenced by the pupil's special interest; for example, a boy who was keenly interested in the school wireless set became a wireless operator (his sight with the aid of glasses being sufficiently good for the work), and another boy, who took a course of practical cookery at the school, became a confectioner on leaving.

Sheffield.

Most of the children at the Sheffield School for the Partially Sighted stay until 16, though a few are allowed to leave before this age if the post is suitable and the parents in poor circumstances. There is no After-Care Committee at the school, but the Head Teacher assists school-leavers in finding work. The teachers at the school do not think that their ex-pupils are any worse off as regards employment than leavers from other schools. Arrangements are made for an officer of the Local Education Authority to make annual inquiries into the after-careers of all children who have attended the school, and this is continued until the children are 21 years of age. An analysis of the type of employment taken by leavers shows that of a total of 41 boys 2 entered the Institute for the Blind to learn a trade; 10 went into cutlery and steel works; 1 became an electrician; 2 sold newspapers; 2 were employed in painting and paper hanging; 3 in French polishing; 2 were employed in a coal mine (1 at pithead and 1 underground); 3 were engaged in hawking; 6 were van boys or errand boys; 1 boy was returned as a cow-man. Of the 58 girls in the sample 32 were in domestic service; 12 engaged in home duties; 5 were shop assistants. One was engaged in etching, presumably in some process making no particular demand upon the sight.

Barrow-in-Furness.

Children are free to leave at 14 if parents so desire, without any conditions being made. There is no After-Care Committee at

the school, but the teacher keeps in touch. The Juvenile Department of the Employment Exchange is responsible for placing in work.

Birkenhead.

Children are normally retained to 16. Withdrawal before that age is allowed for employment at home or for entering into occupations which are recommended by the Juvenile Employment Officer after inquiry into the home circumstances and nature of the work proposed, and if the School Medical Officer gives his sanction. The Juvenile Employment Bureau is sometimes instrumental in effecting placings in employment, though more often the positions are found by the parents themselves, or through the interest of friends. The parent or employer is required to submit a quarterly report on work and progress.

Birmingham.

Children leave after 14 by the permission of the Ophthalmic Surgeon. They are placed if possible by the Juvenile Employment Bureau, and visited regularly during the first three years after leaving.

Bristol.

Children leave at 14 if parents so desire, without conditions being attached. There is no school After-Care Committee. The Head Teacher keeps in touch as far as possible. Placing is by the Juvenile Employment Bureau.

Leeds.

Children leave before 16 only in special cases, and only on recommendation of the School Medical Officer. An After-Care Register is kept at the school and regular inquiries are made in one school up to the age of 16; in another for five years after leaving. The placing agency is the Juvenile Employment Bureau.

London.

Suggestions made in the Annual Report for 1926 of the School Medical Officer as to the most suitable occupations for Myopes.

The occupations are in two grades, the first selection (A) is mainly of the outdoor type, enabling the worker to be standing and moving—the general health is likely to be better for the freedom of movement enjoyed and with the improvement of general health the state of the eyes is likely to be benefited. The second selection (B) involves sitting and stooping to some extent and is therefore not so good for the body and the eyes.

Boys.

A.

Nursery Gardening.
Messengers.
Insurance Agents.
Rent collectors.

B.

Stick and pipe mounting.
Pipe makers.
Some branches of brush making.

Boys.—*continued.*

Piano tuners.	Basket making.
Poultry farming.	Artificial flower making.
Hawking or street trading.	Confectionery.
Travellers or canvassers.	Boot mending.
Shopwork under good conditions.	Metal punching.
Wire workers (bird cages, etc.).	Upholstery.
Hotel and Club servants (no lifting).	Coffin making.
Chemical soap and candle factories (wrappers and packers).	Builder's merchant.
Skin dressing and tanning.	Ironmonger.
Social and welfare workers (N.S.P.C.C., R.S.P.C.A., Y.M.C.A., etc.).	Tobacco stripping and cigar making.
School attendance officers.	Veterinary assistants, zoo keepers, animal care and breeding.
Theatre attendants, liftmen and door porters.	Machine minders (layers-on in printing).
Telephone operators (private firms).	
French polishers.	

GIRLS.

A.	B.
Florists' work.	Box making.
Waitresses and stillroom workers.	Envelope folding.
Dairy shops.	Show card mounting.
Under nursemaids (no sewing).	Some branches brush making.
Light warehouse work (packing).	Cork sorting.
Helpers at Schools for Mothers.	Cementing and black bordering.
Helpers at special schools and dining centres.	Stockroom work.
Domestic service (place carefully selected).	Artificial flower making.
Hotel and Club servants (no lifting).	Fancy paper workers.
Social and Welfare workers (Y.W.C.A., N.S.P.C.C., R.S.P.C.A., etc.).	Stationery trade.
Telephone operators (private firms).	Cigar making and tobacco stripping.
Chemical soap and candle factories (wrappers and packers).	Upholstery.
Skin dressing and tanning.	Confectionery.
Wire mattress weaving.	Knitting factory.
French polishing.	Metal punching.
	Pipe makers and mounters.
	Machine minders (layers-on in printing).

Occupations followed by ex-pupils of London Schools for the Partially Sighted, ascertained in November, 1924 :—

Shops, porters, messengers, assistants, etc. ...	109
Factories, warehouses, packers, van boys, etc. (not trades)	52
Employed occupation unknown	49
Domestic and allied occupations	44
Artificial flower making	3
Bootmaking	4
Building	1
Carpentry, etc.	5
Clerical work	2
Engineering and motor trades	6
French polishing	5
Furriers	2
Leather trade	7
Printing	4
Piano manufacture	1
Silversmith	1
Tailoring	4
Upholstery	2
Umbrella making	2
Weaving	1

Occupations of children under supervision of the After-Care Association for Blind, Deaf and Crippled Children, 1933,
(a) from Schools for the Partially Sighted (high myope children) :—

Shop Assistants	9
Messengers	5
Factory work	5
Florist's work	3
Packing	3
French polishing	2
Umbrella making	2
Wireless work	2
Boot work	2
Gardening	1
Box making	1
Stock room work	1

(Carried forward 36

						Brought forward	36
Upholstery	...	...	...	...	...	...	1
Woodwork	...	...	...	...	...	...	1
Pea sorting	...	...	...	...	...	...	1
School of pharmacy, odd boy	...	...	...	...	...	...	1
Mending typewriters	...	...	...	...	...	...	1
Filing optician's prescriptions	...	...	...	...	...	...	1
Making surgical bandages	...	...	...	...	...	...	1
Paper folding	...	...	...	...	...	...	1
Van boy	...	...	...	...	...	...	1
Delivery boy	...	...	...	...	...	...	1
Milk round	...	...	...	...	...	...	1
Unknown: parents will give no information beyond							
" in work "	...	...	...	...	...	...	9
							<hr/> 56 <hr/>

(b) From schools for the blind, i.e., " decertified " children :—

Woodwork	...	...	...	...	...	...	4
Nursemaid	...	...	...	...	...	...	4
Messengers	...	...	...	...	...	...	3
Packing	...	...	...	...	...	...	2
Hawking	...	...	...	...	...	...	2
Milk rounds	...	...	...	...	...	...	2
Kennel maid	...	...	...	...	...	...	1
Shop assistant	...	...	...	...	...	...	1
Bill posting	...	...	...	...	...	...	1
							<hr/> 20 <hr/>

